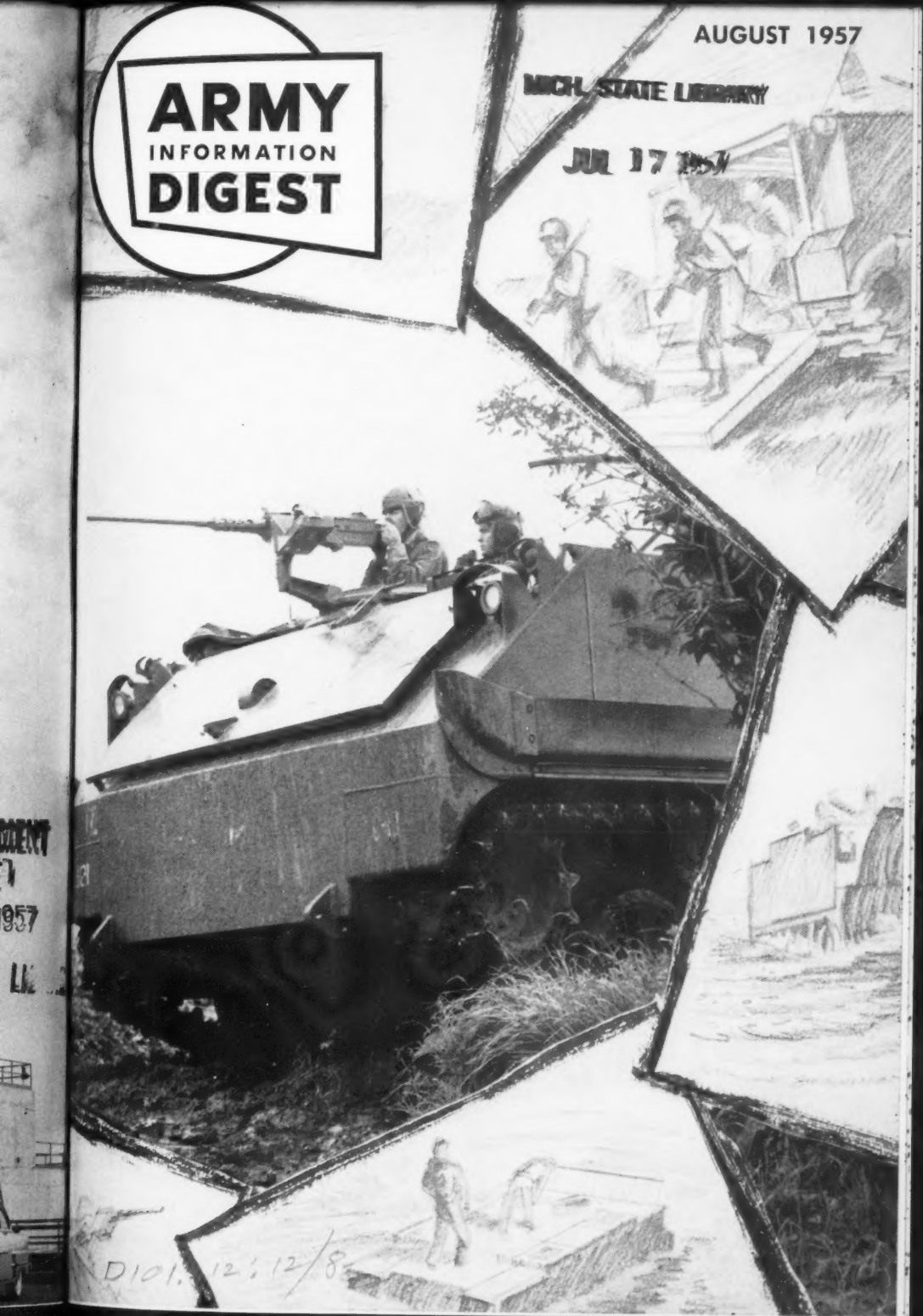

THE OFFICIAL U. S. ARMY MAGAZINE

ARMY INFORMATION DIGEST

THE OFFICIAL MAGAZINE of the DEPARTMENT OF THE ARMY

The mission of ARMY INFORMATION DIGEST is to keep personnel of the Army aware of trends and developments of professional concern.

THE DIGEST is published under supervision of the Army Chief of Information to provide timely and authoritative information on policies, plans, operations, and technical developments of the Department of the Army to the active Army, National Guard, and Army Reserve. It also serves as a vehicle for timely expression of the views of the Secretary of the Army and the Chief of Staff and assists in the achievement of information objectives of the Army.

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ASSISTANT EDITOR
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PRODUCTION EDITOR
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Samuel J. Ziskind

ASSOCIATE EDITORS
Joseph F. Bierstein, Jr.
Owen J. Remington

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AFTER PROVING its versatility in Stateside tests through mud and swamp, over land and water, the M59 armored personnel carrier is now deployed with troop units overseas. On the front cover, men of an armored infantry battalion prepare to advance in an M59 during a training exercise at Baumholder, Germany.

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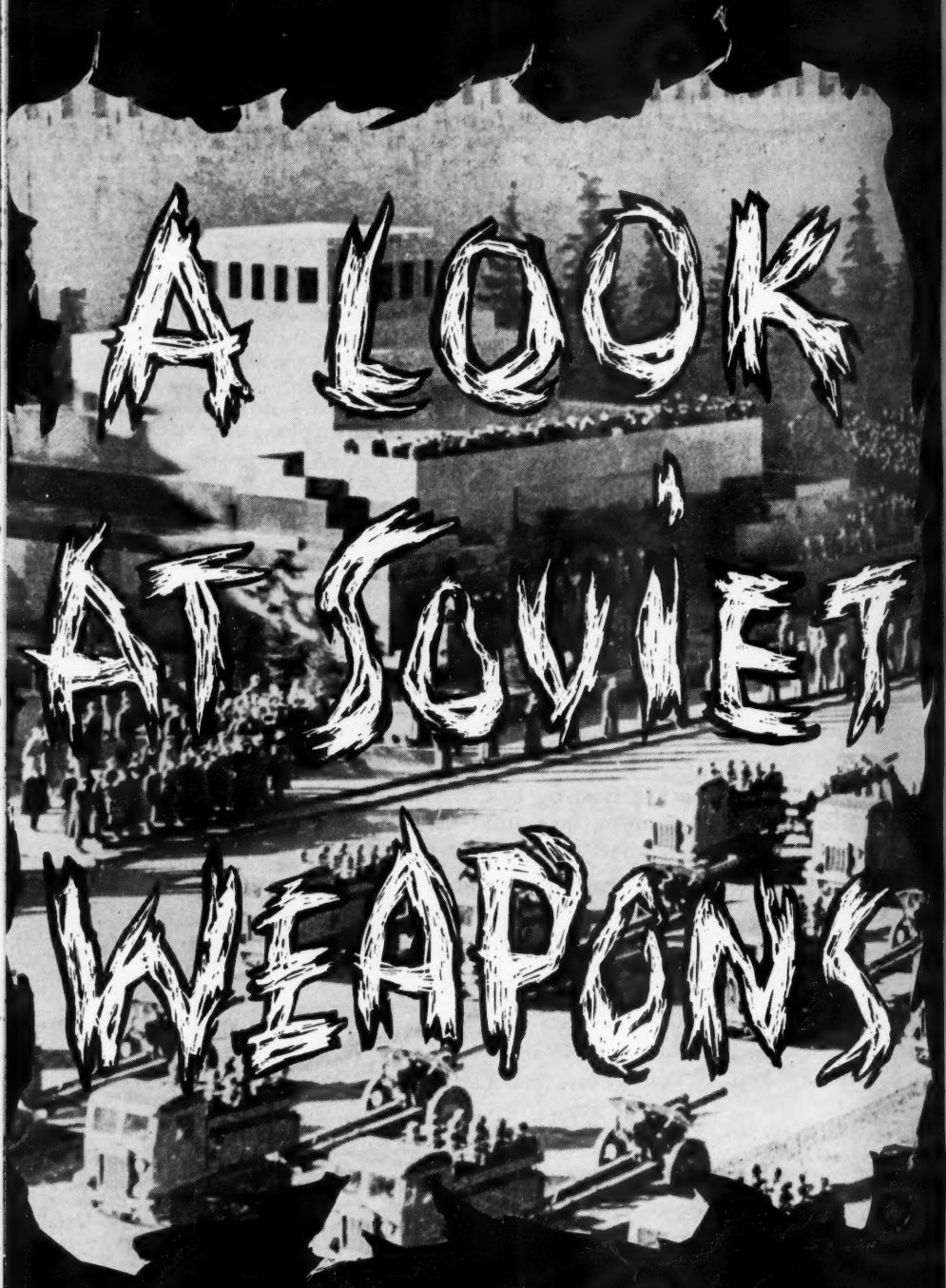
Stepped up mobility and fire power, emphasis on simplicity and standardization, are among the significant impressions gained from

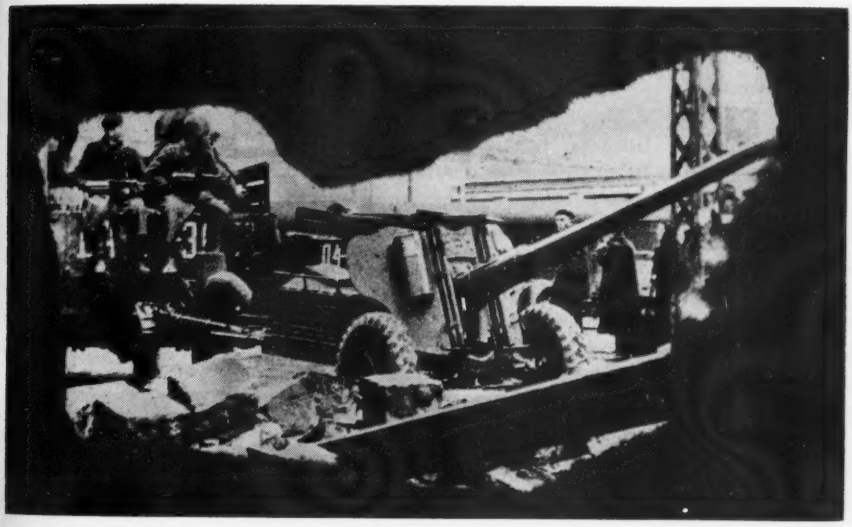


SUCCESSFUL warriors have historically respected an opponent's capabilities. An army's capabilities depend on many factors, all interrelated, and the importance of any single factor might be debatable. No one, however, will contest the relative importance of an army's weapons, qualitatively and quantitatively, as being one of the more important factors to consider in arriving at an objective appraisal of a nation's capability to attack, or to defend itself.

The following summary of Soviet weapons should enable the reader to evaluate this factor for himself as it pertains to a possible opponent.

THE WORLD was given a peek at some of the Soviet weapons while the Hungarian freedom fighters were being sternly suppressed. A glimpse of Soviet equipment used in Egypt was briefly splashed across the world's news pages. Some of the equipment seen in both places was old, much was new, but most of it was manufactured since World War II.

Few Americans can forget the poor showing demonstrated by the Red Army against Finland in 1939, and many may remember the efforts of the Red Army in defense of its homeland in World War II. Most uninformed Americans today still think of Soviet equipment as cheap, second class, poorly made, and of necessity, simple enough for unschooled peasant masses to operate. The cold facts present a very different picture.



"In Hungary, artillery pieces having a small, self-contained power plant attached to one trail of the weapon were observed."

The Soviet Army is the only major force in the world today that has a completely new postwar arsenal of weapons, in being, in the hands of trained troops, capable of

fighting either a nuclear or non-nuclear war, big or small, in any kind of climate or terrain.

MOBILITY, FIREPOWER and STANDARDIZATION are the key words that best describe the emphasis by the Soviets on their postwar weapons development program.

The most significant change in the Soviet weapons system has been the overall improvement in mobility. This is evidenced by the mass use of armored personnel carriers, the significant appearance of large numbers of amphibious vehicles, and continued use of self-propelled assault guns.

In Hungary, artillery pieces having a small self-contained power plant attached to one trail of the weapons were observed. The gun is capable of limited battlefield mobility by use of a steerable castor wheel mounted to the end of the trail, with power from the engine driving the gun carriage wheels. Such a modification obviously suggests a move to solve some of the expected problems of rapid concentration and swift dispersal on the atomic battlegrounds of tomorrow.

The numerous new trucks now organic to all combat elements and the thousands of postwar tanks which have been produced prove that conventional means of mobility have not been overlooked by the Soviets. Cargo and personnel-carrying helicopters and a new turbo-prop, high load, short take-off air transport point up a marked capacity to conduct operations with relatively small, self-contained airborne task forces and in logistical support of rapidly moving massed formations, spear-headed by heavily armored columns.

SELDOM do wise warriors signal their best weapons or tactics. Only the naive would doubt a guided missile capability of the USSR.

The following photographs and descriptions provide a factual basis for individual appraisal of the present-day capabilities of the

Mass-produced T-54 tank retains best features of T-34, and in addition has thicker armor, heavier gun, more than 200-mile cruising range, lower silhouette.

"The new 107mm recoilless antitank gun is mounted on a wheeled carriage, but can be set up in firing position on a tripod mount."

Soviet Army. In drawing conclusions as to the extent of Soviet innovations, the reader might compare these weapons with the Red Army materiel of the Finnish campaign and of World War II.

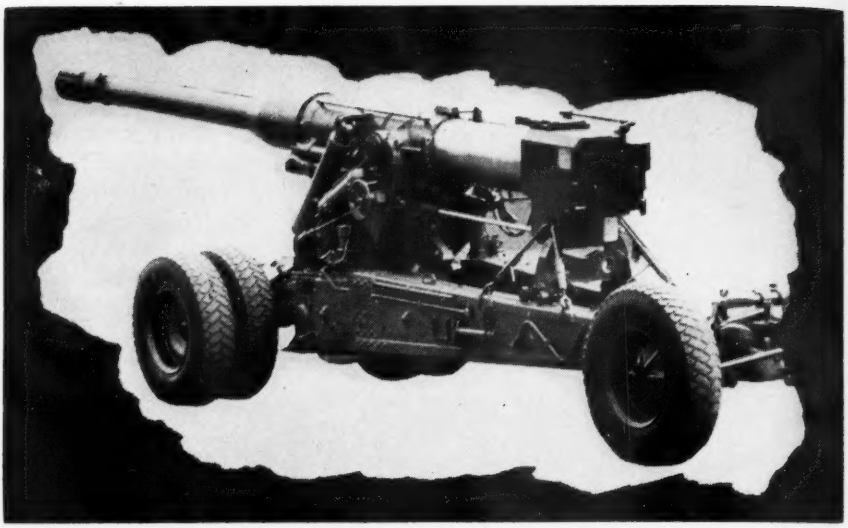
ARMOR

THE T-54 tank is the mass-produced armored combat vehicle that succeeds the T-34 of World War II fame—the same T-34 which proved so effective against the best German armor and which was also a thorn in the United Nations side in the early days of the Korean conflict.

The T-54 retains the best features of the T-34 and, in addition, has a lower silhouette, improved sloping surfaces to deflect enemy fire, thicker armor, and a heavier gun. Its new 100mm gun, equipped with an excellent fire control system, will penetrate thicker armor at greater distances than was possible with the 85mm gun used on the T-34.

The T-54 is a postwar development; it is powered by a 12-cylinder diesel engine and has a cruising range well in excess of 200 miles. It has been issued by the thousands to Soviet combat units as a standard weapon.

The remarkably effective Joseph Stalin series of heavy tanks of World War II are still in use and available to back up the newer heavy tanks. The Soviet opponent is assured there will be plenty of heavily armored and armed targets to counter.



With range of 28,000 yards, a 50 percent increase over the World War II version, the new 203mm gun-howitzer . . .

ARTILLERY

THE Soviets' entire new artillery system includes guns of impressive mobility and effectiveness and a new family of tracked artillery prime movers for their rapid emplacement and dispersal.

The new Russian 203mm gun-howitzer, which can be emplaced and ready to fire in a matter of minutes, replaces a World War II version that required more than a day and a half to put in firing position. It has a range of some 28,000 yards, a 50 percent increase over the 19,000-yard range of the gun used in World War II. This gun-howitzer and the 240mm heavy breech-loading mortar give the Red Army at least two weapons that could, caliber-wise, fire atomic shells.

The 240mm mortar—largest caliber weapon of its type in use by any army—is readily truck-drawn. While mortars are normally considered infantry weapons providing close support to foot soldiers, the Soviets have traditionally used the larger calibers as comparatively inexpensive mobile, short-range artillery. The 240mm mortar has an impressive range and accuracy and a high rate of fire. With conventional shells it could be employed either for close support or long-range fire.

A 152mm howitzer, highly effective in World War II but so heavy and cumbersome that it frequently bogged down in the field, has been made fast and mobile by virtue of a new carriage. The weapon's range has been increased nominally, largely through improved ammunition for this and all other Soviet artillery pieces.

A new version of the 122mm gun, increased in range by about 10 percent—from 22,000 to 25,000 yards—can be emplaced and put into action against enemy targets

with far greater speed than the 122mm gun of World War II.

The Soviets have standardized gun tubes to a remarkable degree. Like calibers found in tanks, assault guns, field guns and antiaircraft guns are basically the same tube.

ANTIAIRCRAFT ARTILLERY

NEWLY added to the Soviet family of antiaircraft guns is a 122mm weapon designed to protect strategic targets against aircraft flying at high altitudes. It is equipped with radar-directed fire control. Troop units have been equipped with an impressive array of medium and light AAA weapons.

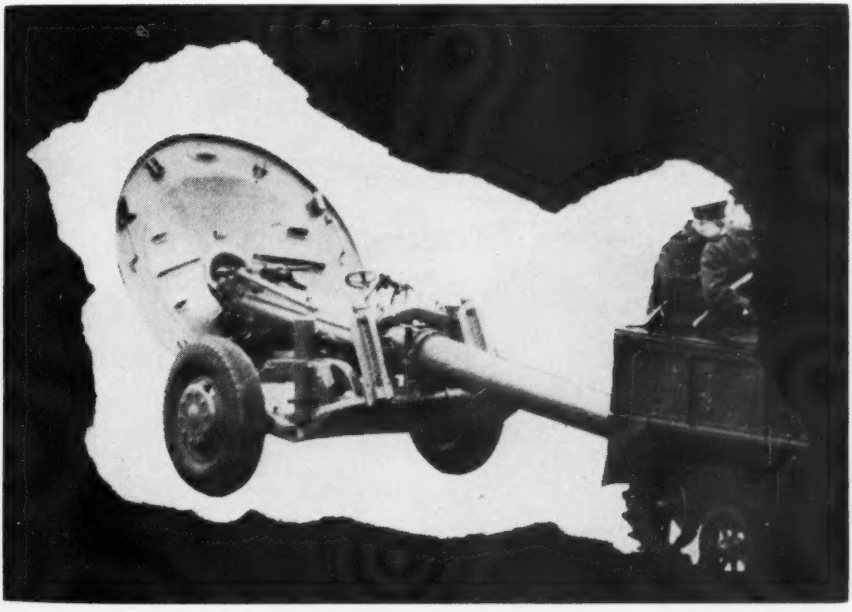
ROCKETS

NEW, long-range and highly accurate truck-mounted multiple rocket launchers have made their appearance with Soviet Army units. Much improved in accuracy and range over earlier Russian models, they include a 12-unit eight-inch rocket launcher, a 16-tube six-inch rocket launcher, and a four-unit, eight-inch rocket launcher. These weapons are highly mobile and are capable of delivering an extremely heavy concentration of massed fire in a very short time.

HELICOPTERS

EXTENSIVE reliance on helicopters by Soviet ground forces contributes greatly to mobility and maneuverability of the re-equipped army.

A new twin-rotor helicopter, the HORSE, which serves as a combination troop-cargo carrier, is capable of transporting 50 soldiers or an equivalent payload of 10,000 pounds. Provided with an engine



. . . and the 240mm heavy breech-loading mortar provide two weapons that could, caliber-wise, fire atomic shells.

The HORSE, a new twin-rotor helicopter, serves as a combination troop-cargo carrier, is capable of transporting 50 soldiers or an equivalent payload of 10,000 pounds.

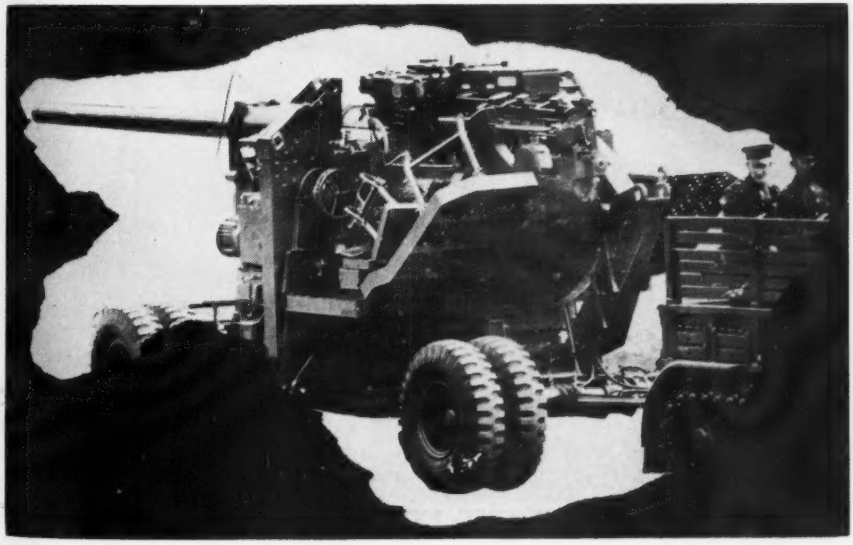
for each rotor, one engine automatically takes over operation of both rotors in the event of failure of the other engine.

A cargo helicopter, the HOUND, is equipped with clamshell doors at the rear of the fuselage for simplified loading and unloading.

The HOUND, a reconnaissance utility helicopter, is a valuable asset for command, liaison and limited supply missions.

Use of turbo-prop, high load, short take-off air transport like the CAMP points to a capacity to conduct operations with relatively small, self-contained airborne task forces.

With an estimated payload capacity of 4,000 pounds, it is capable of transporting jeeps, field artillery pieces and other items of relatively heavy ground force equipment. This helicopter is a valuable asset for command, liaison and limited supply missions.



New to the Soviet family of antiaircraft guns is a 122mm weapon designed to protect strategic targets against high altitude aircraft.

BASIC WEAPONS OF THE SOVIET SOLDIER

Basic to all arms is the gas-operated 7.62mm rifle, weighing 8½ pounds, equipped with attached bayonet, using 10-round magazine (top). The new 7.62mm submachine gun (center) is fed by a 30-round curved box magazine, weighs 9½ pounds, is gas-operated and appears in two versions. At bottom is the 7.62mm light machine gun. It is gas-operated, fully automatic, weighs 14½ pounds, and provides the base of fire for the rifle squad.

INFANTRY WEAPONS

SIMPLICITY of the postwar Soviet weapons system is demonstrated by the new family of small arms.

The new rifle, submachine gun, and light machine gun all fire a standard 7.62mm short round.

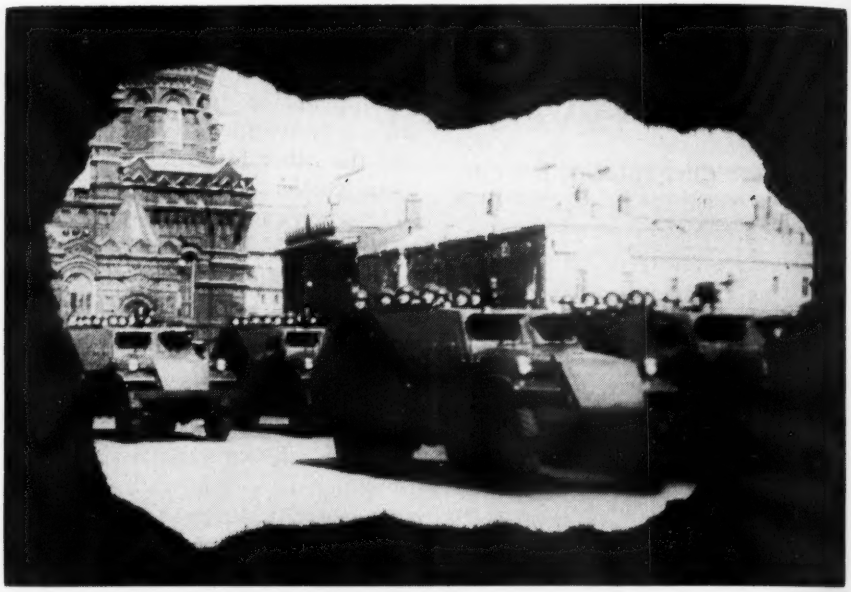
The rifle—referred to by the Soviets as a semiautomatic carbine—is gas operated, equipped with a 10-round magazine and has a permanently attached folding bayonet. Effective combat range is about 440 yards. This basic weapon is employed by all arms. It weighs 8½ pounds and has a stock made of laminated wood.

The 7.62mm submachinegun is lighter in weight, simply constructed, and more accurate at greater ranges than the model it replaces. Weighing 9½ pounds, is fed by a 30-round curved box magazine. This gas operated weapon appears in two versions, one with a conventional wooden stock and the other fitted with a folding metal stock.

The 7.62mm light machine gun provides the base of fire for the rifle squad. It is gas-operated, fully automatic only and belt fed through a drum-type magazine. This squad weapon weighs 14.5 pounds and has a combat range of approximately 660 yards.

A new 82mm infantry antitank weapon is breech-loaded, recoilless, and fires an 82mm fin-stabilized shaped charge projectile. It has an effective range of 440 yards with an armor penetration capability of 8 inches. This weapon weighs about 166 pounds.

Firing a fin-stabilized shaped charge projectile, the new 82mm infantry antitank weapon is breech loaded, recoilless, weighs about 166 pounds.



Most significant change in Soviet weapons system is the overall improvement in mobility, as evidenced by mass use of armored personnel carriers . . .

A new 107mm recoilless antitank gun is mounted on a wheeled carriage but can be set up in firing position on a tripod mount. Weighing 600 pounds, it can be towed by a prime mover or by hand. Its maximum indirect fire range is several thousand yards but it has an effective direct fire range of about 880 yards, and can penetrate 10 to 12 inches of armor. This regimental antitank weapon is also found with the motorized battalions of mechanized regiments.

AS FOR the many other weapons available to the Soviet Army, suffice it to say that related equipment has more than kept pace with the new and improved weapons. Communication equipment now available and in use in combat units is modern and flexible. Mechanization has vastly increased in all fields. For example, modern ditching machines are now used to dig fortifications, mine laying vehicles are used for installing mine belts, and the use of cranes, amphibious ferries, and amphibious tractors has given the Soviets a greatly improved capability for both deliberate and rapid stream crossing operations.

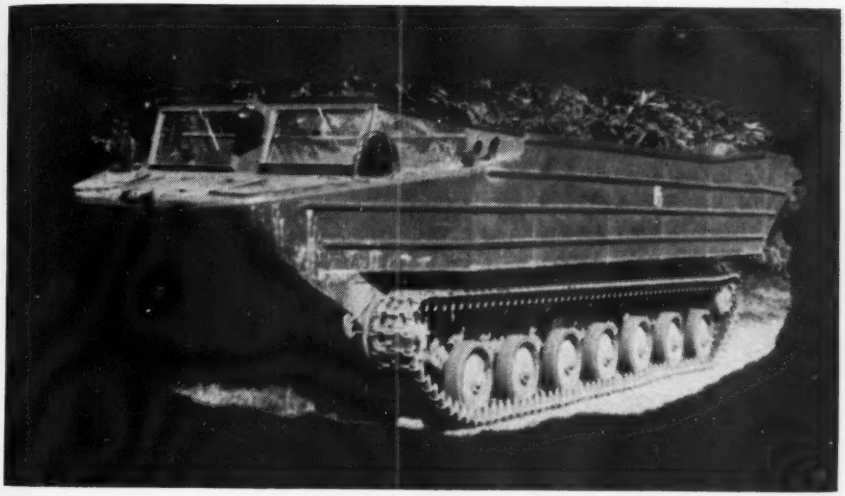
On the whole, it is apparent that the Soviets are following a definite program designed to give them superiority in mobility and fire power.

While recent headlines have concentrated on the sensational aspects of atomic, guided missile, and aircraft development, little has been said about the modern "hardware" now operational in the 175-division Soviet Army. The standardization of ammunition, gun tubes, basic ve-

hicles, and armored chassis demonstrates that considerable thought has been given to streamlining supply and maintenance. The stark simplicity of many Soviet weapons is further evidence of the Soviet research and development program conducted since World War II rather than an indication of any inability to produce complicated weapons.

Mr. Bulganin's threats of the use of rockets against Western European nations and Mr. Khrushchev's reminder to the United Kingdom, France and Israel during the Suez

. . . large numbers of amphibious vehicles . . .



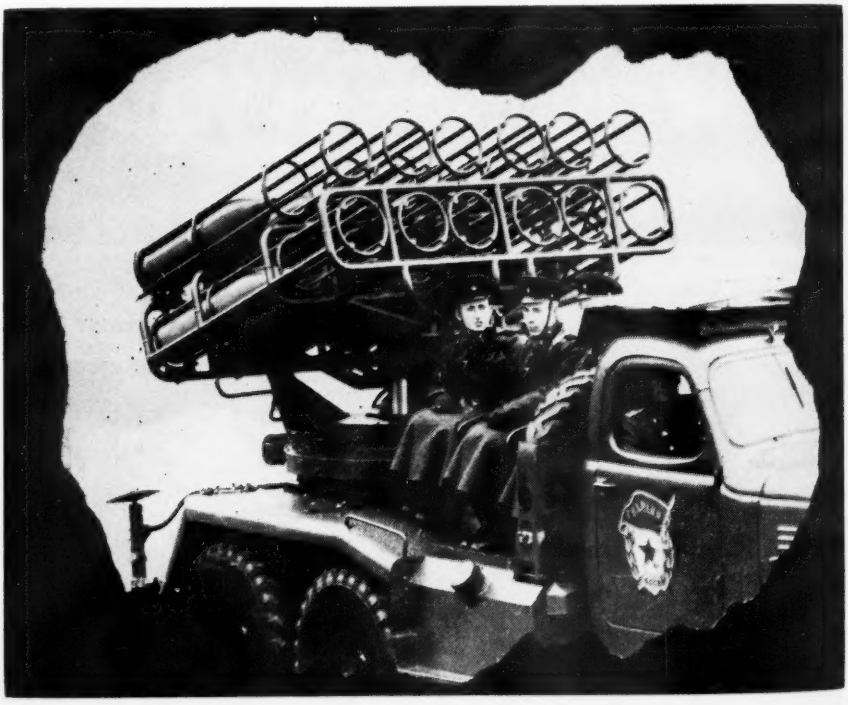
. . . and continued use of self-propelled assault guns.

situation that they were within missile range of the Soviet Union have served an important purpose. To be forewarned is to be forearmed.

WITH a new generation of well-educated and trained manpower now available to the Soviets, continued marked improvement in the design, use, and maintenance of Soviet weapons and weapons systems may be expected. The relative advantage formerly maintained by United States firepower and mobility is being steadily narrowed. The Free World can no longer rest assured that it is safe from a devastating attack by the USSR or any other nation that possesses modern weapons and a desire for world supremacy.

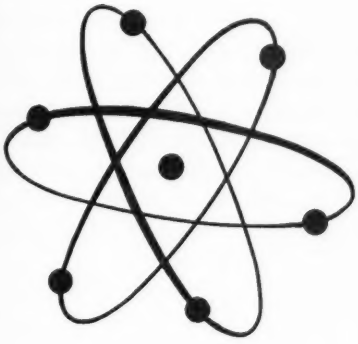
If the United States Army is to achieve superiority on tomorrow's battleground, it must look to significant improvements in its overall effectiveness through a well-planned, vigorously executed, and adequately supported research and development program.

Ninety percent of parity, to borrow a phrase, is no longer insurance against catastrophe.



This highly mobile twelve-unit, eight-inch rocket launcher contributes to the Soviet capability of delivering heavy concentrations of massed fire. A four-unit launcher also is in use.

A giant stride toward self-sufficiency in heat and power at isolated stations is provided by the Army's



NUCLEAR POWER PROGRAM

William B. Taylor

THIS SPRING the Army Package Power Reactor (APPR-1) began generating electrical power from nuclear energy at Fort Belvoir, Virginia. The APPR-1 is the first of a family of military nuclear power plants being developed under a joint program of the Army and the Atomic Energy Commission (AEC). As the first military reactor built in this country primarily for the production of electrical power, the APPR-1 is a forerunner of field plants designed to provide compact reliable systems for supporting vital overseas military operations where logistics of conventional fuel is difficult and expensive.

Development of the APPR-1 marks the culmination of five years of combined effort by the U. S. Army and the Atomic Energy Commission to build this first pilot plant on behalf of the Department of Defense.

MAJOR WILLIAM B. TAYLOR, USA-Retired, is on the staff of the Corps of Engineers Research and Development Laboratories, Fort Belvoir, Virginia.

Built for the Army under an AEC contract by Alco Products, Inc., of Schenectady, New York, for about $2,400,000, the plant will be turned over to Army control following completion of extensive tests. The total cost of the plant, including supporting research and development by the Army and AEC, is somewhat greater than the direct cost of design and construction indicated by the contract price. Succeeding plants of course should not cost as much, and already plans are being worked out for the succeeding types that will be made available for military uses.

Basically, the APPR-1 project has three major objectives:

- *First,* to prove by actual operation the feasibility of the design which incorporates some significant departures from previous reactor experience.
- *Second,* to provide operating data and experience on which to base design, construction and operation of similar plants in remote areas.
- *Third,* to provide a facility

for training military crews for operation of remote plants.

Quite obviously, the first two objectives will require time since, as with any operation of this nature, performance must be observed closely, records must be kept, possible weak spots carefully noted and corrected, and in general the entire equipment must prove itself in every respect.

The third objective, however, was actually well in process of being realized by the time the operation began. To procure the skilled technicians to run the first plant, the Corps of Engineers in April 1956 inaugurated a new branch of its military engineering activities. Thirty-four members of the Armed Forces and one civilian were sent to the University of Virginia for a special basic preparatory course in the fundamentals of nuclear power plant operation.

After five months at the University, the trainees, representing all of the services, were assigned to on-the-job training at Atomic Energy Commission laboratories and contractors' plants. From this group will be drawn instructors for the school that now is being set up by the Corps to train others in operation of military nuclear reactor power plants. The Corps of Engineers is performing this training function for personnel of all the armed services.

THE Army Nuclear Power Program at present includes projects covering three general types of military power plants—fixed, semimobile, and mobile. In addition, special purpose plants for certain specific needs other than electricity and heat also are being studied.

FIXED POWER PLANTS

ALTHOUGH termed "fixed plants," this type is being designed so that major components may be transportable in C-124 aircraft, and the plants can be assembled in a few months, using relatively standard construction methods. All but the heaviest components and those such as the reactor vessel (which may be quite radioactive after use) will be salvageable for use elsewhere.

This type is to be used at relatively permanent installations in remote areas, such as the arctic, where fuel logistics is difficult and expensive. It is the tremendous "power density"—or obtainable energy per pound—of nuclear fuel when compared to conventional fuel, that gives promise of great savings in operation despite probable high initial costs.

Thus a pound of enriched uranium in the APPR-1 can deliver about 2,600,000 kilowatt-hours of energy compared to about 1½ kilowatt-hours that can be delivered by a pound of diesel oil in standard generator sets. The APPR-1 is designed to operate at full power for over a year on a single fuel loading smaller than a barrel and weighing only a few hundred pounds (of which about 50 pounds is active nuclear fuel). When this is compared with a diesel plant that would need some 50,000 barrels to produce the same amount of energy, it is readily seen that tremendous savings in hauling costs are possible from nuclear systems.

At some remote bases, fuel requirements for heat and power alone account for 75 percent of the

total annual logistical supply requirements. Oil for certain arctic bases, it has been found, may cost more than $42 per barrel due to the necessity of flying it in.

Analysis of nuclear power plant costs as compared to an oil-fired plant at a remote base supplied wholly by airlift indicates that, after about five years of operation, the cumulative cost of the nuclear system may be less, even though its initial cost is greater.

The fixed type plant in remote areas could pay for itself over a period of years. In wartime, when conventional fuel supplies might be endangered or cut off, the nuclear plants very obviously would be of strategic value far exceeding that measurable in monetary terms.

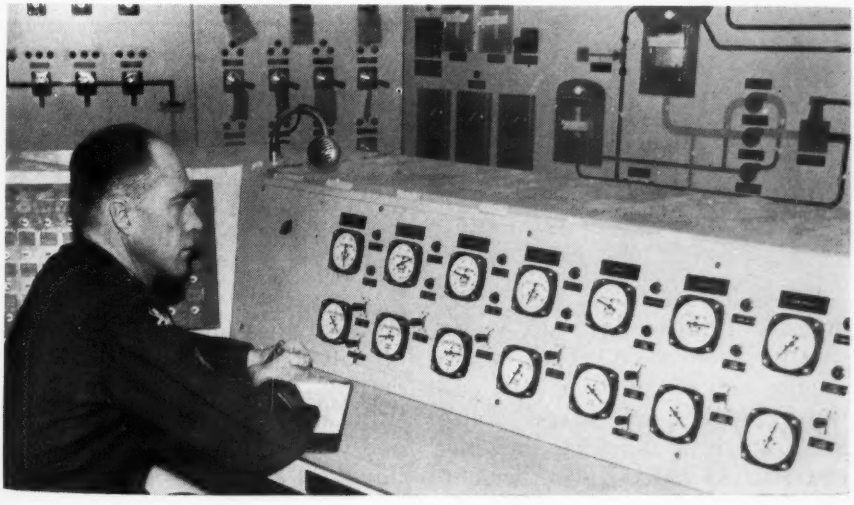
BESIDES the APPR-1, the fixed plant category includes the Argonne Low Power Reactor (ALPR), a prototype plant with about a tenth the electrical output of APPR-1. Construction is planned to start this year at the AEC's National Reactor Testing Station, Arco, Idaho.

The ALPR is designed to meet Air Force specifications for utilities —about 200 kilowatts of electricity and 1,300,000 BTU's per hour in steam for space heating—at DEW-line installations in the Far North. This type plant is also of interest to the Army and Navy for possible use in polar operations.

Still another fixed-type plant, now in the preliminary design stage, is a larger unit capable of supplying about 20,000 kilowatts of electricity. This could be used advantageously at oversea bases in temperate-climate areas, where the problem of supplying ordinary fuel is difficult.

Designs have also been prepared for plants that would provide heat only. By eliminating the requirement for production of high quality steam to drive an electric generator, such plants could be built with much less complexity and weight.

At the control board, this Army Master Sergeant keeps close check on the functioning of the package power reactor plant.



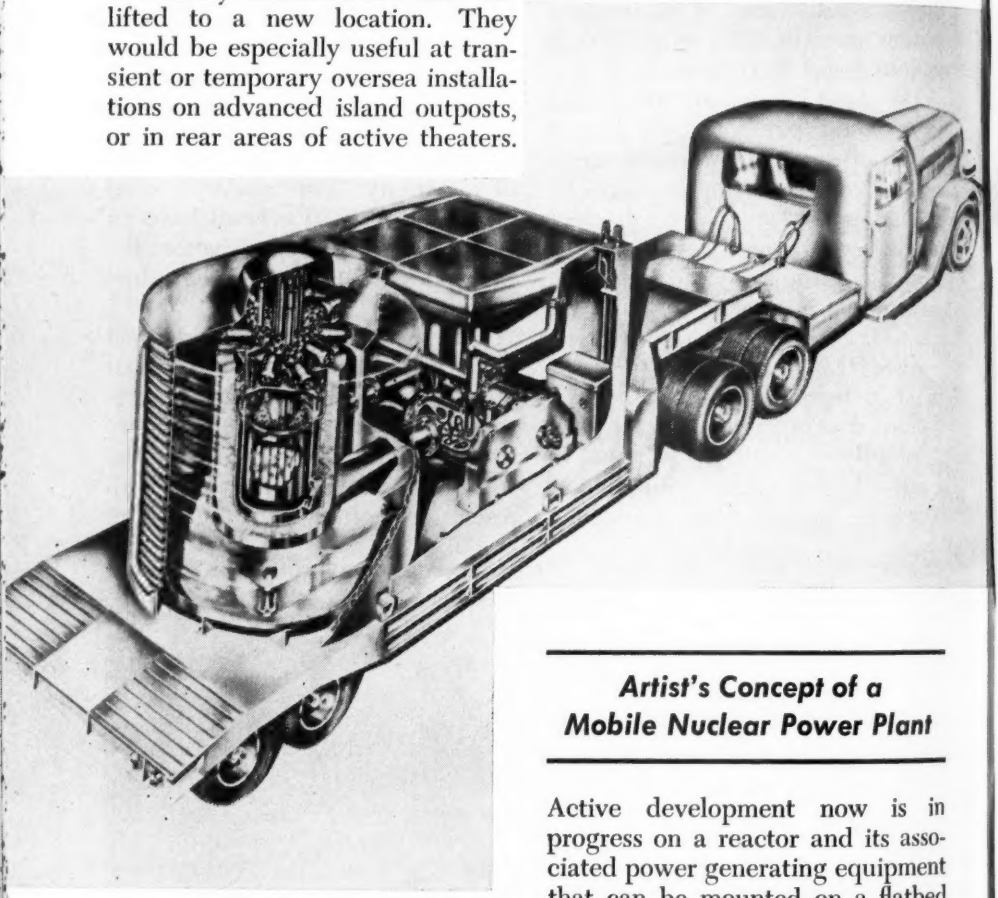
SEMI-MOBILE PLANTS

KNOCKDOWN type plants, made up of air-transportable modules and capable of being assembled in a matter of days, rather than months, could furnish several thousand kilowatts to a major military complex in a relatively static situation. These could be readily disassembled and airlifted to a new location. They would be especially useful at transient or temporary oversea installations on advanced island outposts, or in rear areas of active theaters.

Feasibility studies and preliminary designs now are under way for such plants. They would require only insignificant fuel and water supplies and would utilize field expedient radiation shielding materials to reduce plant weight. However, a prototype plant is not expected for several years because of difficult problems involved in developing reactor materials and components.

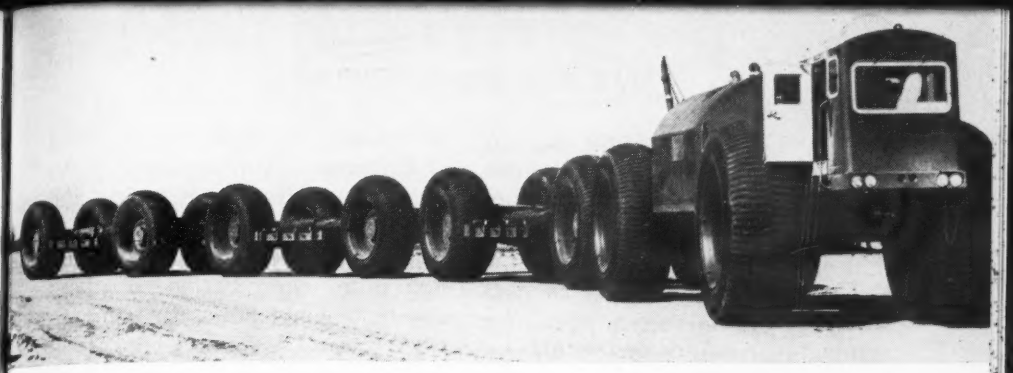
MOBILE PLANTS

SMALL, compact systems designed for mobility by air, land or water also are being planned.



Artist's Concept of a Mobile Nuclear Power Plant

Active development now is in progress on a reactor and its associated power generating equipment that can be mounted on a flatbed trailer or railway car, and could be airlifted complete in a C-124 aircraft. Plants of this type, with outputs of several hundred kilowatts and essentially free from fuel and water supply problems, would be useful in remote, arid areas and



The Army Transportation Corps is studying possible application of nuclear power in diesel-electric overland logistic cargo carriers like this Sno-train.

for field hospital and depot power supply in an active combat theater. Such plants would also be valuable in support of missile operations.

Design work also is progressing on nuclear plants packaged in barges similar in size to the oil-fired barge-mounted power plants which were used by the Army to furnish power during World War II, and in Korea and Okinawa. The Navy's Bureau of Yards and Docks is studying barge-mounted reactor plants. These could greatly reduce tanker space required to support ovearsea mobilization bases or polar operations. They also would be of value for use in disaster areas.

SPECIAL PURPOSE PLANTS

IN ADDITION to plants designed for production of power and heat, the Army and the AEC are studying and developing reactors for other military uses. The Army Quartermaster Corps has an active program to determine the practicality and advantages of preserving foods and materials through intense ionizing radiation. Experiments have been conducted (See "Preserving Food by Radiation," October 1956 DIGEST) and a project now is underway to build a U.S. Army Ionizing Radiation Center at Sharpe General Depot in Stockton, California. This facility will include an electron accelerator as well as an intense gamma source built by AEC.

The Army Transportation Corps is studying possible uses of nuclear energy in feasibility and design studies on a reactor-powered overland cargo carrier, patterned after the existing diesel-electrical driven, pneumatic-tired "sno-train." (See "Supporting Far North Operations," July 1956 DIGEST). Such a vehicle could haul large cargoes for almost unlimited ranges in remote areas without refueling.

Thus the APPR-1 is a first step in a continuing program to build lighter, more compact nuclear power plants that would reduce the military logistic load in a number of ways.

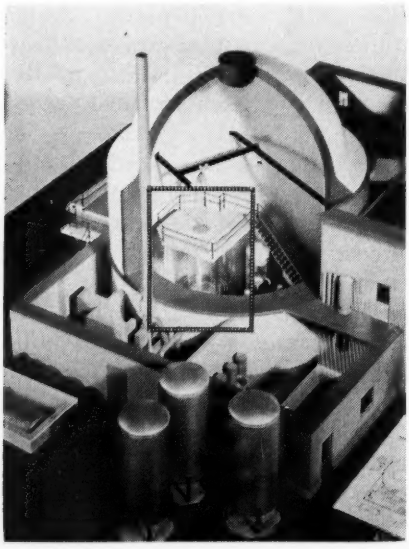
WORK on the Army Nuclear Power Program began in 1952 when the Corps of Engineers was directed to study the non-destructive military uses of atomic energy. Following a year of study by the Army and the AEC's Oak Ridge National Laboratory, the Joint Chiefs of Staff by 1953 issued a requirement for development of such plants in a range of output

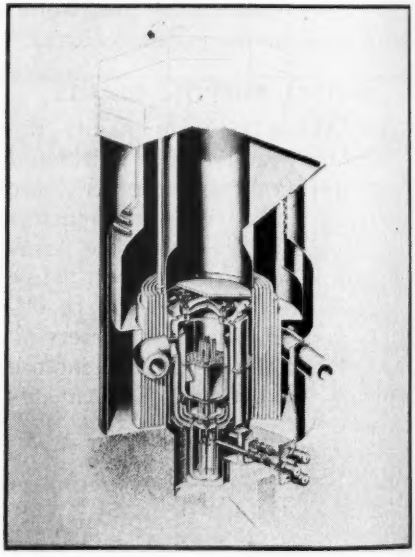
capacities ranging from a few hundred to some 40,000 kilowatts. The Army was directed to carry out this development with the AEC for all the military services.

The Corps of Engineers was designated the Army's agent for conducting and co-ordinating research and development in this entire field. Responsibility for military application studies, development of non-nuclear components and training of nuclear power plant operators was assigned to a Nuclear Power Branch in the Engineer Research and Development Laboratories at Fort Belvoir. This came under direct supervision of the Special Assistant for Nuclear Power on the staff of the Chief of Engineers. Development of the required reactors was made the responsibility of an Army Reactors Branch in the AEC. To assure maximum coordination of both efforts, Colonel James B. Lampert, USA, was assigned concurrent duties as director of activities both in the AEC and in the Corps of Engineers.

These combined activities now include some 100 assigned personnel, about 75 being Corps of Engineers military and civilian engineers and technicians; and the remainder representing the Air Force, Navy, AEC and other Army services.

BUILDING of APPR-1 was based on a conceptual design prepared by Oak Ridge National Laboratory. Electric power is produced from any reactor system by removing heat from the critical mass of nuclear fuel and then using the heat to drive a turbine which in turn drives a more or less standard generator. In the APPR-1, heat





Model of APPR-1 shows interior of vapor container which includes reactor and primary system components. Enlarged cutaway view of reactor core (right) shows concrete and steel shielding rings, reactor pressure vessel, control rods and drives, and primary coolant piping.

is removed from the reactor by water pumped through the fuel core under pressure so high that it prevents boiling. A heat exchanger transfers the heat from this high pressure water to a secondary steam system which drives the turbine-generator.

The exhaust steam from the APPR-1 turbine is condensed by cooling water from the Potomac River, and then is returned to the heat exchanger, supplemented by purified make-up water obtained from the local water system. The reactor with attendant nuclear radiation is completely isolated from external sources of cooling water, and there is no possibility of introducing radioactivity into adjacent water supplies.

All components of arctic versions of the APPR-1 will be designed to be transportable by air. Present planning calls for the capability of installing such a plant within a six-month construction season. "Air transportability" specifications require that no component exceed a weight limit of 10 tons, or a size limit of 7x18 feet. The turbine-generator and main condenser at Fort Belvoir were excepted—but for arctic plants or others in remote areas, these exemptions probably will not be allowed.

Another feature of the APPR-1 that would not necessarily be incorporated in plants at remote bases is "containment." At Fort Belvoir, a "vapor container"—a large, cylindrical, vapor-tight, steel and concrete shell—encloses the reactor itself and all components through which flow the high pressure reactor cooling water.

The container is designed to confine safely all of the radioactivity that could possibly result in the unlikely event that all of the other interlocking safety factors should fail to shut the reactor down first. In the APPR-1, this doubly cautious design accounts for about 20 percent of plant construction costs and greatly increases the size of the prototype plant over what might be expected in a field version.

In sparsely populated areas, such super-safety features may not have to be incorporated. In any location, however, certain basic physical considerations limit reduction of size and weight of nuclear power plants. The most significant factor is that a minimum mass of material is required as radiation shielding. In the APPR-1, the shielding consists of appreciable amounts of iron, water and reinforced concrete.

Ingenious combinations of special materials and new geometric arrangements can reduce this weight by a few percent, but reduction in shielding weight by large amounts cannot now be foreseen. The use of local expedient materials such as dirt, sand or gravel is expected to permit building a safe reactor in the small size required for use in semi-mobile or mobile plants.

Dedication of the APPR-1 marks another significant milestone in Army history. With the opening of this first package power reactor for production of electricity on a utilitarian basis, the U. S. Army, which pioneered in production of atomic energy for destructive purposes, has helped open new vistas to greater uses of nuclear energy for the benefit of all mankind.

In lieu of certificates,

Your Signature Will Serve

Major Eames L. Yates

IN A vigorous move to cut down on the Army's long-standing certification requirements, less than a dozen out of some 500 standard certification forms continue to be required of officers and noncommissioned officers.

Object of the campaign, according to Lieutenant General Donald P. Booth, Deputy Chief of Staff for Personnel, is twofold—to enhance the prestige of officers and noncommissioned officers by reasserting the traditional concept that the signature of a military man is his word; and to continue the fight against unnecessary paperwork throughout the Army.

An Army Certification Review Board appointed late in 1955 has already completely eliminated more than 120 certification statements, including even the time-honored one on the Morning Report. All in all, more than 500 have been examined and of these approximately eleven, it has been decided, will be retained permanently.

Forms considered inappropriate and now completely eliminated include:

- The requirement that officers reviewing 201 files certify that they will not remove any papers.
- The requirement that officers attending school certify that textbooks purchased by them were necessary to pursue their courses.
- The requirement that an officer certify as to the accuracy of the efficiency report.

In the future, certification will be restricted to such cases as will permit the signer actually to certify to the accuracy of a report, or to the execution of a responsibility, on which he has personally checked. In the Morning Report form, for instance, it was noted that it is not possible for the signer to check every detail. Consequently a simple signature in lieu of a formal certificate will be held to suffice.

Similarly, signatures will be held sufficient on most documents now requiring certification. However, certificates will continue to be required in such matters as inventories, or where required by law, or where great significance may be attached to the matter in question.

Certificates considered essential for efficient conduct of Government business, for example, include the certificate by an appraiser as to the fair value of land to be acquired by the Corps of Engineers. In such cases, retention of the certificate is considered valid.

MAJOR EAMES L. YATES, Infantry, is on the staff of Military Personnel Operations Division, Office of the Deputy Chief of Staff for Personnel, Department of the Army.

STUDY of the certification problem disclosed that some of the requirements had been imposed by Department of the Army; others were imposed by other agencies as a result of inter-service requirements, while still more had been imposed by subordinate commands.

In order to implement the campaign, the Army has published AR 1-85 which states in part:

"It is a fundamental principle of military law, as well as a long established custom of the Army, that an officer's signature is in itself a certification by that officer of the truth of all that is contained in the document to which the signature is affixed. . . . The indiscriminate use of certifications serves only to lessen the significance of certificates when required. Hence, certifications should be required of officers only when necessary by statute, authority superior to the Department of the Army, or when it is desired to bring the unusual importance of a matter forcefully to the attention of all concerned."

Further supplementing the campaign against unnecessary certifications, AR 310-1 and 310-3 on military publications have been changed to state that certifications will not be included in publications, including forms, unless they are required by law or by agencies other than the Department of Defense, or unless they may be essential to conduct government business.

AS A RESULT of the Army's concerted drive against unnecessary paperwork, the long-familiar phrase "I certify that . . ." may be expected to become a rarity in Army parlance, to the echoing approval of numerous officers and NCOs.

Introducing the Army's Tactical Support Center

A NEW vehicle-mounted Army coordinating center has been developed to give commanders instant control over tactical support elements under dispersed conditions of nuclear-age warfare. Called the Tactical Support Center (TSC), the system allows a field army commander to weld mobile support forces into a coordinated, power-packed team.

Two such Centers—designed and built by the U. S. Army Signal Engineering Laboratories at Fort Monmouth, New Jersey—were tested by the XVIII Airborne Corps in the King Cole maneuvers at Fort Polk, Louisiana.

The TSC—housed in 13 vans and trucks, with additional tents carried in the vans—is organized into five major organizational sections: the control center, which serves as headquarters for the TSC director; the direct support aviation section; the electronic warfare section; the fire support or artillery section; and the air defense section.

The TSC concept provides for use of nearly every available communications medium, including radio, teletypewriter, telephone, television and facsimile. Present plans envision use of a television system for transmitting situation data between sections. The Center also contains darkrooms for reproducing maps and photographs.

Under the present setup, command decisions on such matters as selection and priority of targets for atomic fire are calculated and ordered by TSC personnel. Sometime in the future it is planned to incorporate an electronic computer into the Center so that target information, priority and selection can be calculated instantly.

The Army will keep its historic regiments under the new

Combat Arms

Lieutenant General Donald P. Booth

EVERY Infantry, Artillery, and Armor unit in the Active Army will soon be part of a famous U. S. Army regiment.

● Every tactical unit of these three combat arms in the Army Reserve and National Guard eventually will also be part of a distinguished United States or National Guard regiment.

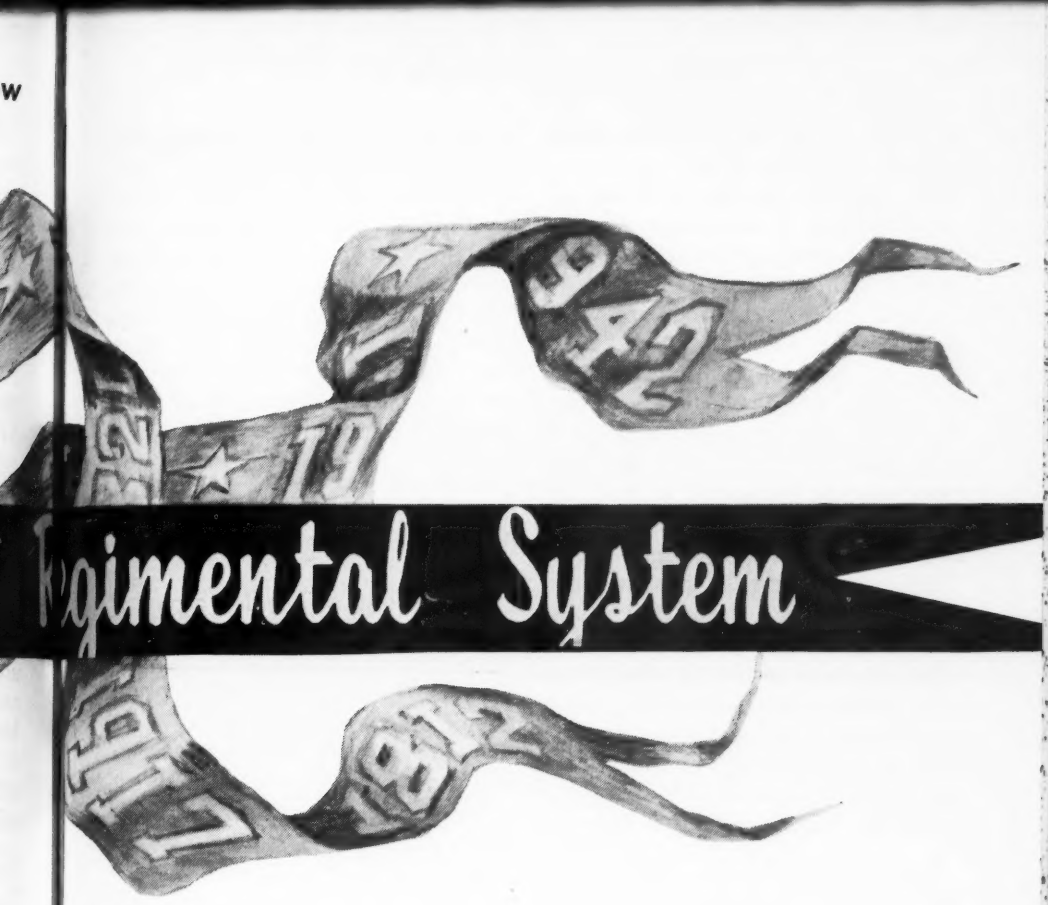
● Even when the Army is fully mobilized, every combat arms unit will be part of a regiment.

● The regiments themselves will be elevated to a new role as "parent" organizations of the units comprising the Army's combat forces. They will be continuously active regardless of changes in tactical organization or in the size of the active forces, in peace or war.

● Each regiment will have a variable number of active units, ranging from at least one in peacetime, up to a dozen or more when the Army expands in wartime.

THESE features are all part of a new system—called the Combat Arms Regimental System—of organizing, designating, and maintaining historical continuity of Army combat units. The plan for its estab-

LIEUTENANT GENERAL DONALD P. BOOTH is Deputy Chief of Staff for Personnel, Department of the Army.



lishment was approved by the Chief of Staff and the Secretary of the Army in January of this year. First steps in converting Active Army units to the regimental system are now being taken in conjunction with the pentomic reorganization of major units. Execution of this phase will extend well into calendar year 1958. Extension of the system to the reserve components will follow later.

By its very nature, the Combat Arms Regimental System is a broad, long-range program which will require a period of years for full accomplishment. It is the product of an extensive study of the problem of achieving continuity in the existence of Army combat units despite the fact that the size and composition of the Army is never static, but changes constantly.

The problem has existed as long as the Army itself, and has grown progressively more acute in recent years. Not only have organizational changes become more frequent in modern times, but also the impact on esprit de corps has increased. Out of each war have come increasing numbers of units with distinguished battle history. Through their lengthening records of achievement, units have become more meaningful, and the inactiva-

tion of a historic unit is more deeply felt.

A corollary to the problem of avoiding loss of historically significant units is that of finding enough units for the expanded Army during mobilization. During each war, new units have been created. Lacking any tradition or precedent at the outset, they have had to build unit spirit from the ground up, and their members are at a considerable disadvantage compared to men in the older outfits with well-known names and reputations.

Studies of future tactical organization indicate a trend toward a more flexible combat structure, with increased problems of adaptation of historic units. On the other hand, many new units have already been formed with designations that run to three and even four digits, but with little or no combat history.

AS AN approach to a solution to this problem, analyses were made of the feasibility of establishing an organizational framework which would remain stable despite large fluctuations in strength. This could not be done with divisions, because the number of organized combat divisions—and their type—varies directly with requirements. Combat divisions, moreover, must be kept at the strength required by their mission. In fact, no organization which forms part of the tactical structure could arbitrarily be fixed in a continuously active state.

The traditional regiments, however, could be used to build the desired framework. First, regiments are the principal repositories of Army history and traditions; they have comprised the basic administrative organization of the "troops of the line" throughout most of the U. S. Army's existence. Second, regiments could be made available for this purpose, particularly since they have to a large extent been replaced in the tactical organization by self-contained smaller units. Third, regiments over the years have undergone many changes in size and form without loss of their historical importance.

THE Combat Arms Regimental System employs the regiment as the basic organization. It provides for—

- Selecting a specified group of historic regiments to be continuously active as the parent organizations of all Infantry, Artillery, and Armor units and individuals.
- Varying the number of active units within each regiment in direct proportion to Army size at any given time.
- Organizing each active member unit as an operationally self-contained unit under an applicable TOE, and assigning it to a division or other tactical command as at present. In this way, units of the same regiment might serve in different divisions, and each might be replaced by a like unit from the same regiment or from any other regiment, as required in connection with unit rotation in peacetime or unit replacement in combat.

Application of this concept to all components requires two kinds of regiments: U. S. regiments for Active Army and Army Reserve units, and National Guard regiments for the National Guard units of each state and territory. The concept limits the regimental system to the Infantry, Artillery, and Armor for the present; later studies

will consider the desirability of extending it to other branches.

Thus far, detailed plans have been developed for establishing the system in the Active Army. A total of 164 regiments were selected as parent organizations of Active Army units, with regiments allocated as follows:

Infantry	55
Cavalry and Armor	27
Artillery	81
Special Forces	1

Regiments comprising this total were selected after a detailed study of historical records, taking age and campaign service into account. Particularly in Armor and Airborne Infantry, there are some comparatively young regiments whose combat records represent the tradition of newer types of units. Among the older Artillery regiments are several formed out of old artillery batteries which have splendid histories going back many years before the official "birthday" of the regiment.

The table on pages 28-29 shows the regiments selected for the Active Army and the general type of units they will have. Designations of Artillery regiments and their member units are still under study.

It should be noted that nondivisional units, as well as those assigned to a division, will be part of famous regiments. This is particularly important, because units of this type often are subject to changes of assignment among several different corps or field armies, and consequently may lack the feeling of having a "home."

DURING the next year and after, enough units will be organized out of each regiment to provide the combat units needed for the Active Army structure. This period of conversion to the regimental system is a difficult one. In a good many cases, the old regiment was broken up some years ago; its fragments may be scattered about, some inactive and some active in a unit under another name.

For example, the 553d, 542d, and 544th Field Artillery Battalions, respectively, are the former 2d, 3d, and 4th Battalions of the old 18th Field Artillery Regiment. As another example, the 51st, 510th, and 553d Armored Infantry Battalions all were part of the old 51st Infantry which fought as part of the 6th Division in World War I.

The "pedigree" of many old regiments has become tangled and obscure because of many reorganizations and redesignations. The Department of the Army is currently engaged in the painstaking process of assembling these fragmentized regiments so that they may pass a clearly defined lineage to their member units.

A second problem area concerns those regiments of Infantry and Cavalry which are still intact, and which will become parent regiments under the system. Since the reorganization of Army divisions is being phased over a period of time, some cases arise requiring the activation of a regimental unit in a pentomic division before the parent regiment itself is reorganized as part of the division in which it is serving.

For example, the 28th Infantry now is part of the 8th Infantry Division in Germany. During the years 1917 to 1939 it was part of the 1st Division. Because of this

PARENT REGIMENTS OF ARMY

Regiment	Year of Origin	† Battle Honors
Airborne Battle Groups, Airborne Divisions		
187th Infantry	1943	9
325th Infantry	1917	10
327th Infantry	1917	8
501st Infantry	1942	6
502d Infantry	1942	6
503d Infantry	1942	5
504th Infantry	1942	6
505th Infantry	1942	7
506th Infantry	1942	6
Armored Rifle Battalions, Armored Divisions		
6th Infantry	1812	41
36th Infantry	1916	6
41st Infantry	1917	9
46th Infantry	1917	5
48th Infantry	1917	4
50th Infantry	1917	5
51st Infantry	1917	8
52d Infantry	1917	7
54th Infantry	1917	6
58th Infantry	1917	9
Battle Groups, Infantry Divisions		
1st Infantry	1791	25
2d Infantry	1808	48
3d Infantry	1784	34
4th Infantry	1812	46
5th Infantry	1808	36
7th Infantry	1812	64
8th Infantry	1838	35
9th Infantry	1855	46
10th Infantry	1855	22
11th Infantry	1861	21
12th Infantry	1861	25
13th Infantry	1861	15
14th Infantry	1861	31
15th Infantry	1861	35
16th Infantry	1861	33
17th Infantry	1861	39
18th Infantry	1861	32
19th Infantry	1861	32
20th Infantry	1861	18
21st Infantry	1861	40
22d Infantry	1861	19
23d Infantry	1861	41
26th Infantry	1901	15
27th Infantry	1901	18
28th Infantry	1901	11
29th Infantry	1901	6
30th Infantry	1901	18
31st Infantry	1916	15
32d Infantry	1916	14
34th Infantry	1916	9
35th Infantry	1916	16
38th Infantry	1917	22
39th Infantry	1917	13
47th Infantry	1917	14
60th Infantry	1917	12
87th Infantry	1941	3
Tank Battalions, Armored Divisions		
1st Cavalry	1833	68
13th Cavalry	1901	8
32d Armor	1941	5
33d Armor	1941	5
35th Armor	1941	6
37th Armor	1941	11
66th Armor	1918	19
67th Armor	1918	10
Tank Battalions, Infantry Divisions		
34th Armor	1941	5
40th Armor	1941	6
68th Armor	1918	18
69th Armor	1940	18
Reconnaissance Squadrons, Armored Divisions		
*12th Cavalry	1901	5
15th Cavalry	1901	7
Reconnaissance Squadrons, Infantry Divisions		
* 4th Cavalry	1855	42
* 5th Cavalry	1855	43
* 7th Cavalry	1866	19
* 8th Cavalry	1866	21
9th Cavalry	1866	22
10th Cavalry	1866	8
Reconnaissance Troops, Airborne Divisions		
17th Cavalry	1916	4
Sky Cavalry Squadrons, Nondivisional		
16th Cavalry	1916	2
Armored Cavalry Regiments, Nondivisional		
2d Cavalry	1836	54
3d Cavalry	1846	36
6th Cavalry	1861	35

† Subject to change as reorganized.

* Also Battle Group, 1st Cavalry Division.

TS OF RMY COMBAT UNITS

Regiment	Year of Origin	† Battle Honors
11th Cavalry	1901	7
14th Cavalry	1901	8
Field Artillery Batteries, Airborne Divisions		
319th Field Artillery	1917	11
320th Field Artillery	1917	10
321st Field Artillery	1917	8
377th Field Artillery	1921	6
Field Artillery Battalions, Armored Divisions		
3d Field Artillery	1907 (1794)	24
6th Field Artillery	1907 (1794)	22
14th Field Artillery	1917	8
16th Field Artillery	1917	9
22d Field Artillery	1918	6
27th Field Artillery	1918	7
73d Field Artillery	1918	5
78th Field Artillery	1917	9
Field Artillery Battalions, Infantry Divisions		
1st Field Artillery	1907 (1792)	23
2d Field Artillery	1907 (1901)	3
4th Field Artillery	1907 (1901)	1
5th Field Artillery	1907 (1776)	19
7th Field Artillery	1916	14
8th Field Artillery	1916	16
9th Field Artillery	1916	21
10th Field Artillery	1917	24
11th Field Artillery	1917	15
12th Field Artillery	1917	21
13th Field Artillery	1917	19
15th Field Artillery	1917	22
19th Field Artillery	1917	7
20th Field Artillery	1917	7
21st Field Artillery	1917	7
28th Field Artillery	1918	4
31st Field Artillery	1918	14
34th Field Artillery	1918	8
Field Artillery Battalions, Nondivisional		
17th Field Artillery	1917	24
18th Field Artillery	1917	10
25th Field Artillery	1918	5
26th Field Artillery	1918	8
29th Field Artillery	1918	6
30th Field Artillery	1918	5
32d Field Artillery	1918	9
33d Field Artillery	1918	8
35th Field Artillery	1918	7
36th Field Artillery	1918	9
37th Field Artillery	1918	17
38th Field Artillery	1918	16
39th Field Artillery	1918	19
40th Field Artillery	1918	5
41st Field Artillery	1918	11
42d Field Artillery	1918	7
75th Field Artillery	1918	6
76th Field Artillery	1917	9
77th Field Artillery	1917	10
79th Field Artillery	1917	17
80th Field Artillery	1917	4
81st Field Artillery	1917	4
82d Field Artillery	1917	11
83d Field Artillery	1917	6
84th Field Artillery	1918	12
92d Field Artillery	1942	17
333d Field Artillery	1917	7
Air Defense Artillery Battalions, Nondivisional		
1st Coast Artillery	1821 (1798)	17
2d Coast Artillery	1821 (1798)	28
3d Coast Artillery	1821 (1794)	24
4th Coast Artillery	1821 (1786)	26
5th Coast Artillery	1861	20
6th Coast Artillery	1898	10
7th Coast Artillery	1898	13
43d Coast Artillery	1918 (1901)	6
44th Coast Artillery	1918 (1899)	11
51st Coast Artillery	1917 (1808)	6
52d Coast Artillery	1917 (1901)	18
55th Coast Artillery	1917 (1901)	7
56th Coast Artillery	1921	20
57th Coast Artillery	1918	17
59th Coast Artillery	1918 (1901)	7
60th Coast Artillery	1917 (1898)	6
61st Coast Artillery	1918 (1808)	11
62d Coast Artillery	1918 (1798)	36
65th Coast Artillery	1917 (1899)	8
67th Coast Artillery	1918	8
68th Coast Artillery	1918	5
71st Coast Artillery	1918	5
517th Coast Artillery	1923	10
562d Coast Artillery	1928	11
Special Forces Units		
1st Special Forces	1942	6

(Origin of the regiment's oldest element is shown in parentheses).

association, the 1st Battle Group, 28th Infantry will remain with the 8th Infantry Division, while the 2d Battle Group, 28th Infantry has been assigned to the 1st Infantry Division at Fort Riley, Kansas. Although the 8th Division had not as yet been reorganized, it was necessary to make an administrative transfer of an element (Company B) of the 28th Infantry to the 1st Division to serve as the nucleus of the 2d Battle Group, so that it would legitimately inherit the history and battle honors of the 28th Infantry.

FIGURE 1 furnishes a schematic example of how a regiment is reorganized into a number of member units.

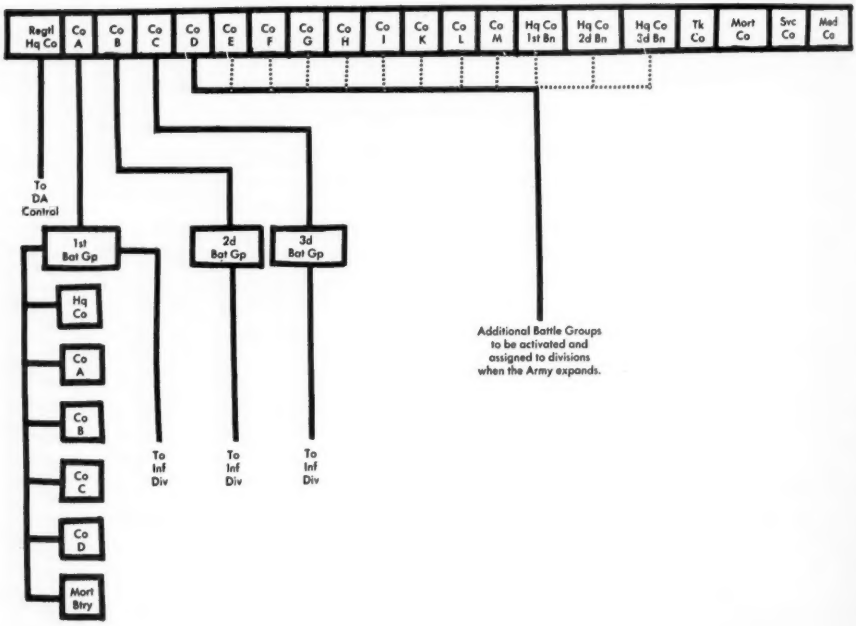
FIGURE 2 illustrates the regimental designations of combat units in a pentomic division, showing the units now assigned to the 1st Infantry Division.

EACH unit of a regiment will carry the colors of the regiment. As time goes on, units will earn battle honors in their own right. These will accrue to the parent regiment, since member units represent the regiment in what they do. Each soldier in a member unit will wear the regimental insignia.

Since regimental headquarters had to be removed from the tactical structure in order to insure their continuation and survival, they are for the time being simply

Figure 1

SCHEMATIC REORGANIZATION OF PARENT INFANTRY REGIMENT



kept alive "on paper." Thus at present the regimental designation represents but a family name for the association of tactical units comprising the regiment. Eventually it is hoped to establish regimental headquarters as corporate bodies performing support functions for regimental members.

STUDIES are in progress concerning the establishment and functions of regimental headquarters. Many suggestions have been received. An idea frequently proposed is that of appointing a senior officer to act as colonel-in-chief of each regiment, in addition to his regularly assigned duties. As such, he would act on matters regarding the history, customs, and traditions of the regiment, counselling with the commanders of the regiment's tactical units. Additional ideas from the field will be welcomed, and all suggestions will be considered.

The regimental plan, it should be emphasized, is not an end in itself. It is a foundation on which to build stronger esprit de corps, improved public relations and perhaps more effective personnel management and training systems in the Army of the future. These are long-range goals. Meanwhile, the immediate period is one of transition.

With each successive implementing step, the regimental system will grow in significance. Because it is a major step, the changes will come about gradually. In this endeavor, the whole Army has an opportunity to assist and to benefit.

Figure 2

COMBAT UNITS, FIRST INFANTRY DIVISION

Infantry

1st Battle Group, 16th Infantry
1st Battle Group, 18th Infantry
1st Battle Group, 26th Infantry
2d Battle Group, 2d Infantry
2d Battle Group, 28th Infantry

Armor

1st Medium Tank Battalion (Patton), 69th Armor
1st Reconnaissance Squadron, 4th Cavalry

Artillery

1st Howitzer Battalion (105mm), 7th Artillery
1st Field Artillery Battalion (Rkt/How), 5th Artillery

An ingenious mechanism—now being adapted for field army use—helps Army surgeons maintain vital body functions through hours of crisis by means of the

ARTIFICIAL KIDNEY

Lieutenant Colonel W. H. Meroney

SINCE antiquity man has sought means to rejuvenate his failing functions and replace his lost parts. In his quest for vigor and health he has performed grisly rituals in supplication of natural gods, submitted to cruel practices of superstition and sorcery, ventured to distant lands in pursuit of healing waters, fountains of youth, health talismans.

Other generations, discouraged

LIEUTENANT COLONEL W. H. MERONEY, Medical Corps, is Chief, Department of Metabolism, Walter Reed Army Institute of Research, Walter Reed Army Medical Center, Washington, D. C.

by reliance upon supernatural phenomena, directed their efforts toward biologic processes. Potions designed to heal, stimulate, or restore were decocted from plants, animals, excreta, and almost every conceivable substance. Immunologic differences between species frustrated all early attempts to transplant tissues from animal to man. Efforts to transfer tissue from man to man also failed until, at last, it was demonstrated that whole blood from one individual would survive and function normally in the vascular system of another individual.

The discovery that individuals fall into kindred groups with respect to the interchangeability of their blood revived the ancient dream of replacement of other deficient organs. If other tissues could likewise be typed and proved compatible, perhaps undamaged organs from an accident victim could be grafted into the living. Indeed, some tissue transplants have recently been accomplished but, so far, successes are limited. No one has succeeded in typing tissues into compatible groups, or in distinguishing the characteristics which give immunologic identity to the individual.

In most instances the tissues of the recipient reject the transplant as a foreign body, much as a thorn is extruded from the festered wound which it provoked. Skin which is transferred from one person to another does not grow, although it may afford temporary protection to a denuded area before it is sloughed off. On the other hand, corneas, which embryologically are modified skin, have been transferred from the dead to the blind to provide permanent restoration of vision.

Certain glands from human embryos have been transferred successfully to adults suffering from serious illnesses caused by a deficiency of those glands. Arteries which are defective from disease, or discontinuous as a result of injury, can be spliced with sections from an "artery bank." The limbs of many combat casualties in Korea were saved by this technique. (See "Battlefield Repair of Blood Vessels," March 1957 DIGEST.)

In spite of these successes, most transplanted tissues are rejected by the immunologic responses of the recipient. A striking exception exists in the case of identical twins, whose tissues, including whole organs, apparently are interchangeable. Considered philosophically, this may not be an exception, because identical twins, having arisen from one egg, presumably would be indistinguishable were it not for environmental differences.

THE possibility of a vastly more important exception stems from a recent report that patients with a certain kidney disease can accept skin grafts from other individuals. If this experience can be reproduced, the modification of the immunologic response provoked by the disease will be investigated in an effort to reproduce the favorable response without the disease. Success in this research would bring nearer to reality the dream of replacing vital organs.

Parallel with researches in organ transplants, and pending attainment of the miraculous, progress continues in the development of inanimate substitutes for living or-

gans. Beginning, perhaps, with the time that primitive man realized that he could not regenerate his lost leg as a lobster regenerates his claw, prosthetic devices of increasing complexity have been devised. At present, almost every branch of medicine regularly employs some mechanical contrivance to perform the function of some tissue which is temporarily or permanently ineffective.

One of the more gratifying of the recent additions to the physician's mechanical armamentarium is the Artificial Kidney. Actually, this is an ambitious and misleading name for this piece of machinery. Although it can perform temporarily one of the many vital functions of the kidneys, in no other way does it bear any resemblance to the natural organs.

In fact, most persons who first see it are astonished by its crude bulk and remark that it would appear less unusual in a laundry than in an operating room. The analogy is rather well taken, because the function of the instrument is to wash the blood free of substances which normally would have been excreted by the kidneys.

NORMALLY the kidneys daily excrete several pints of water in which most of the solid wastes produced in the body are dissolved. No other organ can perform this function. While it might appear that the gastrointestinal tract excretes solid body wastes, this actually is not true for any significant portion of wastes *produced* by body processes. Excreta represent wastes contained in the food which were never absorbed.

The food which is absorbed into the body tissues and "burned" becomes carbon dioxide (which is excreted principally by the lungs) and solids and water (which are excreted principally by the kidneys). When the kidneys fail in their excretory function, the substances which should have been in the urine accumulate in the blood, where they are toxic, producing so-called "uremic poisoning."

THERE ARE many *chronic* diseases in which the kidneys fail slowly, over a long period, and although these diseases are common and sometimes fatal, the Artificial Kidney, as presently designed, is not very effective in their treatment. The principal application of the Artificial Kidney is in *acute* kidney failure, where the affliction of the kidneys is potentially reversible—*i.e.*, cases in which the kidney disorder would heal within a few weeks if the patient could survive "uremic poisoning" for that period. In this instance the Artificial Kidney can be used to wash the urine from the blood, so to speak, and thus enable the patient to survive until the kidneys heal.

A common cause of acute kidney failure is severe injury, but the injury need not—and usually does not—involve the kidneys directly. Severe injury to any part of the body, particularly when associated with hemorrhage and shock, can cause kidney failure. Each day urinary wastes accumulate in the blood stream, and if the condition persists, the patient will surely die.

IN WORLD WAR II, as well as in all previous wars, civilian disasters, and individual accidents, kidney failure of more than brief

duration was uniformly fatal. In the Korean War an Artificial Kidney and the necessary supporting equipment and personnel were established in the combat zone, and many wounded men were restored to health from conditions previously considered hopeless.

The Artificial Kidney removes wastes from the blood by a process known as *dialysis*. This may be compared with filtration, except that there is fluid on each side of the filter which can pass in either direction, depending upon which side has the highest concentration of the particular substance to be filtered. The filter normally used is cellophane, a semi-permeable membrane of such a pore size that it will pass dissolved chemicals but not blood cells, plasma proteins, or bacteria.

If blood is in contact with cellophane, on the other side of which is a dialyzing fluid, a dissolved chemical which is in the blood but not in the dialyzing fluid will pass through the cellophane until the concentration of the chemical is the same on both sides. The converse is also true: a chemical which is in the dialyzing fluid but not in the blood will pass through the cellophane in the opposite direction until equilibrium is reached.

BASIC element of the Artificial Kidney is a cellophane tube, which doubles as a dialyzing membrane and a conduit for the patient's blood. From a tube inserted in the wrist artery, blood flows through the cellophane tube in a continuous circuit back into the patient's vein. The blood which is thus outside the patient's body but confined in the tube is dialyzed into a fluid which bathes the tube.

The bathing fluid contains the essential chemicals of plasma but no wastes. Since the exchange across the cellophane wall is in both directions, those substances which are in excess in plasma will dialyze into the bath, and those deficient substances will dialyze into the plasma from the bath.

In order to increase the frequency of contact, the tube is coiled around a drum which is rotated in the tank of fluid.

Initially, there is a rapid loss of wastes from blood to bath. As the process continues, and concentration in the blood is reduced as that in the bath is increased, the rate of exchange diminishes. The rate can be accelerated by discarding the bath and replacing it with a fresh one containing no wastes.

THE principles by which chemicals dissolved in two solutions separated by a semi-permeable membrane come into equilibrium have long been known, and some fifty years ago a type of Artificial Kidney based upon these phenomena was devised. The instrument might well have been successful except for lack of a practicable means for preventing the blood from clotting as it circulated through the tubing. Anticoagulants then available were unsuitable.

Today with Heparin as an anticoagulant, it is relatively easy to prevent the blood from clotting as it circulates through the machine. The temperature of the blood is maintained at 98.6° F. by an automatic electric heater, and the proper content of oxygen and carbon dioxide is assured by a flow of these gases under a plastic hood

which encases the spiral tube. The blood is pumped gently into a plastic reservoir where any clots or bubbles are removed. The flow is kept constant, with the physical, physiological, and biochemical state of the patient and the integrity of the apparatus under continuous scrutiny by attending physicians.

A SIX-HOUR dialysis on the Artificial Kidney is dramatically effective in reversing completely—if temporarily—symptoms and signs of severe "uremic poisoning" indicating impending death. The procedure does nothing to hasten the healing process in the kidneys; it only substitutes for their excretory function until healed by nature.

Since the time required for healing often is longer than a patient can survive without removal of waste from the blood, the Artificial Kidney can be a real life-saver. In Korea many patients were saved who would have had no chance whatever in World War II, and unlike so many of the more dramatic feats of medicine, recovery of survivors was complete.

The most widely used Artificial Kidney is the Brigham-Kolff rotating model, although several others are comparable in effectiveness. Most of the models in general use are large, heavy machines which are designed for use in the well-equipped operating rooms of fixed medical centers. Their usefulness in military situations is limited by the difficulty of transport and installation.

Although it was possible to establish such a unit and the supporting equipment in the combat zone of Korea, a major effort was required. Line officers, pilots, and a host of specialists in supply and utilities supported and assisted the Army Medical Service in this operation. The magnitude of the effort and expense, however, were justified by the knowledge accumulated and the lives saved.

The Korean experience which demonstrated that it was desirable and feasible to use Artificial Kidneys in support of a field army in combat, also pointed up the need for small, portable models. As a result, the Army Medical Service is seeking to develop a variety of small Artificial Kidneys designed for easy transportability and application. If the patient's condition or the tactical situation prohibits evacuation to the rear, it is intended that a small Artificial Kidney can be delivered and operated in the forward area.

Several pilot models are currently being tested, and although their efficiency seems satisfactory, no way has yet been found to reduce the requirement for bulky and elaborate supporting equipment. However, if the dialyzing apparatus itself can be designed for portability, there is little doubt that the more commonplace pumps, tanks, and motors can also be modified.

The knowledge is available. A successful outcome would appear to be an inevitable result of continued research and development by the Army Medical Service.

THE U.S. ARMY—A KEY TO PEACE

In AFFE/8A all manner of local facilities are used to keep men and materiel

ON THE MOVE — In the Far East

Colonel Ervin D. K. Hoehne

REVOLUTIONARY as the changes may be in warfare, every army everywhere sooner or later faces the same dilemma. There is never enough transportation.

Though means of battlefield locomotion are integrated into virtually all fighting units in today's modern Army, there must be other vehicles to carry the personnel and the mountains of supplies and ammunition required for their support. Transportation preparedness calls for a constant search for new and better means of moving these men and materials.

In the Far East the dilemma is being solved by utilizing every means of commercial transportation from oxcart to streamliner. In this strategic area a high degree of combat readiness was mandatory, yet there were unprecedented difficulties to be overcome in developing the land transportation required to support the combat forces. In Japan alone, for example, over 1,300,000 ton/miles of military freight and 70,000 passengers must move daily.

To accomplish such a move with Army resources would require enough trucks and buses to form a convoy stretching from Boston to Philadelphia. Operation and support of such a convoy would take the full-time attention of 65,000 troops—equivalent to a complete Army corps. These troops and their more than 30,000 dependents in turn would make a total of nearly 100,000 additional persons to be supported at the end of the world's longest supply pipeline.

Of course, the Army never contemplated making such movements with its own resources. Instead, the answer obviously lay in the development and use of indigenous transportation industries—a solution that was easier to conceive than to execute. Nevertheless,

COLONEL ERVIN D. K. HOEHNE, Transportation Corps, is Regional Director, Central Traffic Region, Military Traffic Management Agency, St. Louis, Missouri. Previous to his present assignment he was Chief, Movement Control Division, Transportation Office, U. S. Army Forces, Far East, and Commanding Officer, Transportation Traffic Regulating Group (8010).

About 45 percent of all military freight in Japan now moves by rail.

Army Forces Far East/Eighth Army (AFFE/8A) is overcoming the many obstacles, and very substantial savings in money and manpower have resulted.

PROGRESS IN JAPAN

ARMY employment of commercial transportation had its beginning in Japan with the rehabilitation of the Japanese National Railways (JNR) after World War II. The rail net had deteriorated during the war years; maintenance and modernization had been neglected. However, this system continued to be the backbone of the Japanese economy and it was upon this somewhat shaky foundation that the occupation forces were obliged to build.

As an essential first step, Army operation of the Japanese National Railways was undertaken with the intent of restoring control to Japanese management at the earliest practical date, thus releasing military personnel from a task that was essentially civilian in nature.

Full return to commercial operation came in 1952 when the present contractual agreement was reached with JNR. This contract, incidentally, provided for a single rate for all military general freight as compared with the more than ten thousand different rates that apply in the United States. About 45 percent of all military freight in Japan now moves by rail.

This diversion of traffic from military to civilian controlled facilities marks a major step in placing reliance on the local economy. However, it leaves more than half of all freight in Japan to be moved by other means. Initially, this had to be accomplished by Army tactical vehicles—types that are neither designed nor intended for commercial over-the-road hauling.

This expedient was necessary due to a combination of factors. First, the trucking industry in Japan had never developed to any significant degree. Railroads had always held a near monopoly on all but local movements. Second, Japan's truck manufacturing capacity was crippled during World War II. Finally, the terrain and roads of Japan discouraged the post-war growth of a trucking industry. Precipitous mountains and deep gorges cover a major portion of the islands. Even today the country has only 5,000 miles of paved highways.

IN SPITE of these handicaps, 40 percent of all military freight now moves by commercial highway transportation.

Major impetus in this direction

"Three - wheelers" expedite delivery of small shipments at Tachikawa Air Base.

came in 1950 when the U. S. Army in Japan was stripped of vehicles to meet the needs of Korea. To fill this void, Japanese trucks were contracted for on an hourly-hire basis. This was followed in 1954 by the first regular commercial trucking contract. Contracts now have been made with the major trucking firms, all of which are growing rapidly. Highways are being expanded and improved by the Japanese government.

Even the terror of the Japanese roads – the three-wheelers – have been used to good advantage. They are being employed on an experimental basis for rush delivery of critically needed items, and their use in other depot and motor pool operations is under study. Still another development has been the leasing of 300 new buses to replace 500 obsolete military buses in the Tokyo-Yokohama area.

THE oxcart, the sled, and the human back-pack have been pressed into use as commercial carriers. Communications installations, isolated on remote mountain tops, must be supplied, yet they often can be reached only by the most primitive trails. Shipments are now being made on through bills of lading that move the goods from port to mountain top. Rail movement, rehandling at the railhead and the final haul into the mountains—all are accomplished by commercial means, and on one shipping document.

As a result of these and other measures, a total of 85 percent of all military general freight now moves by commercial means in Japan. Even the remaining fraction no longer places a tremendous demand on American military personnel. Under a broad contract with the Japanese Government, administrative motor pools are staffed largely with indigenous personnel working as drivers, dispatchers, guards and mechanics.

In port operations, too, a significant portion of military cargo is discharged with the use of commercial stevedores, barges, lighters, tugs and cranes. Even where a military port is used, as in Yokohama, local employees outnumber men in uniform seven to one.

Thus in Japan every effort is being made to free the military man for military duties. Tactical vehicles, with their high initial and maintenance costs, have been replaced in large numbers by commercial operations. Equally significant, this has been accompanied by a steady improvement in the

quality of transportation service supporting the combat units.

KOREA AND OKINAWA

THE trend has been much the same in Korea and Okinawa, although the transportation base in those areas is less highly developed. Korea, in particular, presented many unique problems in developing an indigenous transportation system. The rail net was inadequate even before it suffered the devastation of war. Damage was suffered in all departments—bridges, repair facilities, rolling stock and motive power. However, the Army succeeded in maintaining rail service throughout the war and today, under Korea management, it carries approximately one million tons of U. S. military freight annually.

Highway transport possibilities in Korea seemed even less promising. The terrain is tortuous, and paved highways are practically unknown outside the metropolitan areas. However, in spite of these difficulties, Korean trucking firms are beginning to take a share of military traffic. Initially, this new commercial service is being employed only in the Pusan and the Inchon-ASCOM-Seoul areas. It is expected that commercial trucks soon will relieve TOE vehicles in other regions as experience is gained in this type of operation.

The drain on military manpower has been further reduced in Korea, as in Japan, by employing local labor in every phase of transportation. Native employees are to be found in the ports, the motor pools, on Transportation Corps refrigeration barges, in traffic regulating units—wherever transportation work is to be done. Again, the objective has been to provide the best possible support with the minimum use of money, materiel and military manpower. That objective has been realized in Korea.

IN OKINAWA there was no problem of rebuilding the indigenous transportation industry simply because there was nothing to rebuild—no good roads, no adequate port. Today, however, superhighways connect the main installations and the beginnings of a local trucking industry are apparent. The first commercial truck contract was signed recently and a "pay-as-you-go" bus service is a success.

Local skills also have been developed so that Okinawans have been able to replace military personnel in many administrative tasks.

Such command policies have had profound effects upon the combat readiness of AFFE/8A. The maximum number of troops are assigned to operational units, yet those units are being supported by a flexible and responsive land transportation system. In addition, substantial savings have been achieved by reliance on the civil economy.

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At the Port of Whittier, Alaska, vital cargo keeps moving with

No Time Out for Weather

Captain Perry Hume Davis III

A CREW of soldier-longshoremen knocked off work at the Port of Whittier one night last winter for two and a half hours while a ship was at the dock. Outside the Alaskan wind was blowing 95 miles an hour. When it died down to 50 they went back to work, and an historic two and a half hours had ended. It was the first time stevedoring had stopped while a ship was in the Port of Whittier since the big fire of 1953.

Even under "normal" circumstances, Whittier is a wild and woolly place to work. Most ports stop work when winds reach 35 knots; but if this applied at Whittier the Army Transportation Corps would get almost no cargo moved. This could slow down the entire military operation in Alaska, for across the Whittier docks move the bulk of ship-borne goods to support Army and Air Force troops and installations in the Territory.

The port is a tiny, self-contained community tucked into a half-mile triangle of land at the west end of Passage Canal, an arm of Prince William Sound in west-central Alaska. On the land side the port is surrounded by mountains. The port itself is built on a flat glacial moraine, carved out in past centuries by the grandfather of the seven glaciers which still point their icy fingers at Whittier.

CAPTAIN PERRY HUME DAVIS, III, General Staff, is on duty with Headquarters, United States Army Alaska.

UNTIL 1942 this pocket of level land was isolated from the rest of Alaska by its wall of mountains. An occasional boatman landed there, and while the area was officially a town site, it could be reached only by water.

This water approach was important, however, to national defense. Passage Canal is deep and ice free, making Whittier a potential year-around port for ships of all sizes. Access to the rest of the world could be by water down the Canal, through Prince William Sound into the Gulf of Alaska and the Pacific.

Access to the rest of Alaska had to be through or over the mountains. These were too high and rugged for successful road building, so in 1942 the Army Corps of Engineers supervised construction of two railroad tunnels which permitted a single-track rail line into the port site. The Alaska Railroad now owns and operates the trackage into the port, and more than 10,000 railroad cars move through the tunnels each year.

Lashing wind, rain and snow add to the difficulties of unloading operations.

THE mountains, glaciers and warm water of the canal make the tiny area of Whittier a cauldron of wild weather. In the summer it rains nearly every day. In winter it snows; even when it is not snowing, violent winds whip around the mountains, blowing more snow down into the little community.

An average of 260 inches of snow falls on Whittier each year, and another 100 inches is blown in. Annual snowfalls have been as high as 570 inches—more than 47 feet!

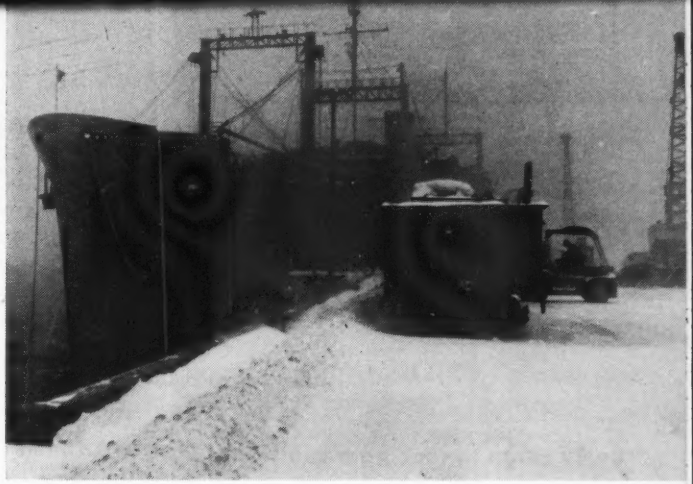
The summer rains are as bad, or worse. Average annual rainfall is 174 inches, and it once rained 7.8 inches in 24 hours. Counting both rain and snow, Whittier has perhaps the greatest annual precipitation of any port in the world.

Coupled with winds which are almost never still, the snow is a constant problem from mid-October to mid-April. During those six months, snow removal frequently is a 24-hour chore at Whittier. Snow depths of 10 to 12 feet on level ground are not uncommon, and it has been as deep as 24 feet. Bulldozers, graders and rotary plows are busy night and day, frequently working behind and between the soldiers as they shift cargo from ship to trains.

WORK goes on despite the weather. When a ship ties up at Whittier's dock, terminal service troops swarm over it until the job is done. On the night of that 95-mile-an-hour gale, they were forced to stop because the winds were swinging winch cables like yarn under a kitten's paw. It was impossible to unload vehicles and other heavy cargo through hatches that allowed only six inches clearance. When the wind died down to the point that the cargo's weight held the cables relatively straight, work was resumed.

The men who do the work at Whittier are soldiers, members of the Army's Transportation Corps. Like most Army units, they are a mixture of old-timers and rookies, roughly one draftee to every two Regular Army soldiers.

The majority of these men, particularly the privates, have never handled cargo before, except for basic training at Fort Eustis, Virginia, the Army Transportation Training Command. Work at Whittier makes veteran longshoremen of these soldiers in a hurry. Men of the two Transportation



At the Port of Whittier, cargo moves directly from ship to rail car.

Terminal Companies at the port load and unload ships and rail cars, operate all the equipment, and make their own special rigging.

The busy port provides lots of practice. In the 12 months ending 1 November 1956, the port handled 10,872 railway carloads of cargo and 29,109 military personnel and their families. The cargo included everything that can travel on ships. Although Whittier is an Army port, it supports all military forces in Alaska. From November 1955 to November 1956, 147,509 measurement tons of Air Force cargo went through the port.

To top off all this work, Whittier is the "mother port" for eight sub-terminals in Alaska. These sub-ports—at Anchorage, Seward, Naknek, Nome, Bethel, Ketchikan, Juneau and Valdez—are used only occasionally, but when they are worked, men from Whittier must operate them.

Four of the locations have no true port facilities at all; in the others, they are scant. To operate these sub-ports, men from Whittier must haul in tackle, rigging, gear and heavy equipment. And while men, gear and tugs are working at sub-ports, the main work at Whittier goes on as usual.

Aside from its importance in supplying military goods to all Alaska, Transportation Corps officers look on Whittier as one of the finest training posts they have. Men who have worked at Whittier, they feel, would be capable of handling military cargo under the most rigorous wartime conditions at any port or beach on the globe.

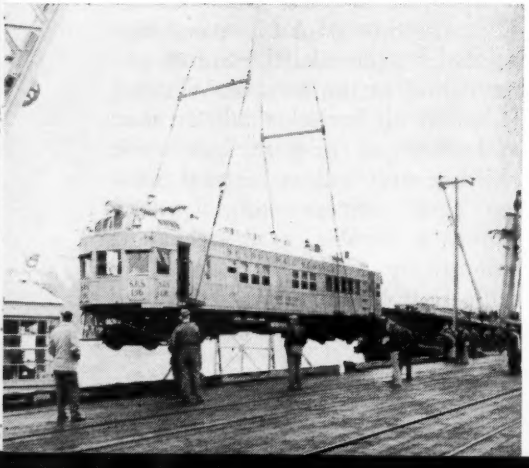
BECAUSE Whittier is isolated and offers little land to build on, it has developed into the most compact Army post in Alaska. The whole installation is keyed to two truly incredible buildings.

The Buckner Building, a six-story mammoth sprawling at the base of a mountain, has been called "a city under one roof" and the description is not far wrong. The structure contains everything needed for the health, comfort and recreation of the men at Whittier. It houses all bachelor enlisted men and officers at the port. Under one roof are mess halls, a hospital, service club, officers club, bowling alleys, a theater, post exchange, commissary, snack bars, an AFRS radio station (soon to be expanded to a television outlet for the port)

Bulky cargo ranges from vehicles . . .

. . . to CONEX containers . . .

. . . and even railroad cars.



and even a guardhouse.

Here are to be found all the activities normally available at any U. S. Army post. It is actually possible to spend days in the Buckner Building without stepping outside. Even getting outdoors is simplified. A tunnel runs from the basement to the dock area.

Two days before Thanksgiving 1956, the Hodge Building—an apartment house for military families—was dedicated. The largest apartment building in Alaska, this 14-story structure contains 177 one-, two- and three-bedroom apartments. It also has laundry rooms, lounges, playrooms for children and a snack bar. A tunnel connects it with the elementary school across the street.

The Hodge Building was a major step in making the Port of Whittier one of the Army's most modern stations. For the service wife who has kept house in the converted barracks of older posts, the up-to-date apartments are a dream. Windows open on a post-card view of some of the loveliest scenery in Alaska.

Isolated as Whittier may be, it offers exceptional recreational opportunities for the person who enjoys the outdoors. In the winter there is unexcelled skiing, skating and sledding, but it is the summer which offers the greatest range of recreation. Fishing in the Canal is excellent; there is no better halibut fishing in Alaska, and many a Whittier deep-freeze is stocked with salmon during the summer.

Boating is a popular sport. The Canal gives access to magnificent fishing, camping and hunting spots, and a great many men at Whittier have built boats in the Special

Service carpenter shops. The port maintains two recreational camps along the shores of the Canal, to which it runs boat trips.

Nor is recreation confined to the immediate Whittier area. Trains run daily to Anchorage, Alaska's largest city, and from there the entire territory is open to the men and women at the Port.

The massive Buckner and Hodge buildings were built as part of a careful plan designed to make Whittier one of the best port facilities in Alaska. A fire in June 1953, which destroyed all of the docks and most of the warehouses at the Port, delayed the plan somewhat, but cargo movement continued with minimum disruption. Some ships were diverted to Seward and others were unloaded on barges, while hurried work put the port back into service by installation of two Delong docks.

Recently completed is a 960-foot dock, capable of accommodating two ships, that will more than double Whittier's capacity. A warehouse 840 by 100 feet provides sorting sheds and in-transit storage, to supplement the former system under which cargo was moved directly from ship to rail.

The new facilities make the Port of Whittier the most modern port in Alaska. But the buildings can do nothing about the weather. As long as the Port of Whittier is in operation it will depend on the skill and willingness of its terminal service troops working in wind, rain and snow to keep United States land and air forces equipped and in readiness for their job of defending our northernmost bulwark.

What's New in

Training AIDs

Keep your organization current with the latest training materials by referring to this section in each issue.

TRAINING LITERATURE

While the following new literature will be published shortly, units are cautioned *NOT* to requisition copies until receipt of automatic initial distribution or the items are listed in DA Pamphlets 310-3 or 310-4.

Combat Training of the Individual Soldier and Patrolling. This updated revision of FM 21-75 (Oct 1950) places particular emphasis on the ROCID squad and platoon organization.

Radiological Survey. A new training circular, TC 3-2, provides guidance for commanders and staffs at all echelons in responsibilities, organization, and conduct of ground and aerial radiological surveys.

Physical Training. A new training circular in the 21-series, this publication covers physical training doctrine for the Army and provides basic guidance for preparation and execution of the Army physical training program.

TRAINING AIDS

Training Films. The following training films have recently been released:

TF 5-2372, Field Engineering in the Subarctic—Part II—Winter Field Fortifications.

TF 7-2434, The 106mm Rifle—Part II—Duties of the Crew and Service of the Piece.

TF 7-2437, The 106mm Rifle—Part V— Using the Spotting Rifle.

TF 17-2387, Auxiliary Means of Communications—Part I—Light Aircraft Message Drop.

TF 17-2388, Auxiliary Means of Communication—Part II—Light Aircraft Pick-up.

TF 46-2423, Transitional Helicopter Flight Training—Part I—Transition to the H-19.

TF 55-2314, Helicopter Maintenance—Part VII—Hydraulic Flight Control Systems.

AFIF 83, The Battle of Gettysburg.

Graphic Training Aids. The following items have been approved for production and distribution:

New

GTA 9-( ), Standardized Rockets.
GTA 9-( ), Principles of Stereoscopic Sights.
GTA 9-( ), Standardized Bombs.
GTA 9-( ), New Standard Mortar Ammunition.
GTA 9-( ), Grenade, Rifle, HEAT, M31.
GTA 10-( ), Emergency Mass Feeding.
GTA 19-( ), Traffic Control Arm and Hand Signals.

Revisions

GTA 9-5, Browning Machine Gun Cal. 50, M2.
GTA 11-14, Message Writing.

ARMY EXTENSION COURSES

The following subcourses have been approved for publication by Headquarters, United States Continental Army Command and are either new subcourses or major revisions:

United States Military History, Common Subcourse 56, Subcourse 59. The Adjutant General School. An introduction to American military history, this course covers the history of the U. S. Army from the colonial period to the conclusion of the Korean War, including an orientation on the fundamentals of the art of war as illustrated in American military experience. The course provides an insight into the effects of technological developments upon tactics, and of tactics upon American military thought.

Foreign Armies Orientation, Subcourse 70. The Adjutant General School. Covers organization and mission of allied commands; degree of political control over foreign armies; similarities and differences between foreign armies and the U. S. Army.

Combat Intelligence and Engineer Reconnaissance, Subcourse 5. Engineer School. Covers procedures employed in producing and processing combat intelligence; organization; capabilities and limitations of engineer technical intelligence teams; sources of information; doctrine and principles of engineer reconnaissance; road and route reconnaissance symbols; engineer reconnaissance report forms.

The Army Supply System, Subcourse 31. Finance School. Review of the basic concepts and fundamentals of supply management to include the application of selected supply techniques with special emphasis placed on developing an understanding of supply responsibilities, at Department of the Army, technical services and installation levels.

Medical Support of Infantry–I, Subcourse 31. Infantry School. Covers principles and practices of emergency first aid in tactical and nontactical situations; personal hygiene and military sanitation; command responsibility for the health of a unit; control measures for specific diseases in overseas commands; employment of the medical company infantry regiment to include special operations; division medical service in support of the infantry regiment; medical aspects of atomic explosions, and the biological effects of nuclear radiation.

Personnel Administration–I, Part II, Subcourse 45. Infantry School. Administration of military justice and unit punishment record; interior management (to include connected duties of the battalion headquarters company commander); unit funds; personnel procedures; officer efficiency reports; and civil affairs/military government.

Signal Orders, Subcourse 13. Signal School. Estimate of the situation and signal planning; routine and combat orders; signal annexes and unit orders; standing operating procedures; signal operating instructions and standing signal instructions; signal diagrams.

PARAGRAPHS

from

The Pentagon and the Field

In a move to establish a common unit of measurement for United States and NATO nations, all U. S. Army weapons and related equipment will be converted to use of the meter for measurement of linear distances, according to recently published AR 700-75. The move is designed to facilitate standardization within NATO, to permit better and more extensive use of allied and captured enemy materiel, and to simplify firing procedures for indirect firing weapons. Conversion is to be accomplished by 1 January 1966.

The Antiaircraft Artillery and Guided Missile School at Fort Bliss, Texas, has been redesignated the U. S. Army Air Defense School, while the Artillery and Guided Missile School at Fort Sill, Oklahoma, has dropped the word "Guided" from its name.

Inactivation of the 5th Infantry Division located at Fort Ord, California, began in June as part of the overall reorganization of the Army under the pentomic concepts of future land warfare. Designation of component regiments will be kept active in the form of separate Battle Groups which will be organized as parts of other divisions. Present plans provide for activation of a U. S. Army Replacement Training Center and for expansion of the Combat Development Experimentation Center at Fort Ord. Troops now assigned to the 5th Infantry Division are expected to be transferred in large part to these new organizations.

Stanford University has been awarded a research contract dealing with planning and control of transportation movements by the U. S. Army in oversea areas. Managed by the Graduate School of Business, the study will investigate all types of transport, including highway, rail, pipeline, and marine, with the possibility of adding air transport if desired. Methods for providing transportation officers with a prompt record of a change in a route's capacity that might result from bombing of a bridge, damage to canal locks, or other causes are to be developed. The study will seek to devise a universal system which the Army Transportation Corps could adapt to any theater of operations.

An extension course in "Emergency Management of the National Economy" is currently being offered by the Industrial College of the Armed Forces for the benefit of civilians and members of the military services who cannot attend the resident courses conducted at Washington, D. C. The ten-month resident course is restricted to a limited number of senior officers on active duty, and civilian government officials.

Objective of the new correspondence course is to educate key personnel to the all-importance of civilian-military interdependence and its bearing on the Nation's economic readiness. Reservists successfully completing the course are awarded forty-eight points for retention, promotion, and retirement. Interested individuals may communicate directly with the Correspondence Study Branch, Industrial College of the Armed Forces, Washington 25, D. C.

With the flight of two twin-engine L-23D aircraft to Germany, aerial delivery of Army aircraft has started to overseas destinations. The aircraft-ferrying method is being tested as a means of economizing funds and time.

Training in aviation safety will be provided to selected personnel during Fiscal Year 1958 through the Army

Aviation Safety Course at the University of Southern California. The course will be conducted for key staff aviators, aviation unit commanders, and safety directors in eight-week classes of approximately 15 students each. Students receive 10 university credits for successful completion. Classes will begin 20 August, 22 October, 7 January 1958, and 11 March 1958. Details are contained in Circular 350-3.

The Chemical Corps Engineering Command, working in conjunction with the Food Machinery and Chemical Corporation, has just completed a unit plant design for production of toxic chemical agents. The process, utilizing new and unique high temperature techniques, eliminates the requirement for high installation investments and reduces operating costs. The new development places the Chemical Corps in a position to expand rapidly and economically in case of a war emergency.

Enlisted personnel with potential for leadership "have a moral obligation to develop their talents to the ultimate," and are being urged to compete for officers' commissions while in the Active Army or Reserve, under Operation Challenge, instituted by General W. G. Wyman, Commanding General, U. S. Continental Army Command. Immediate target is the sizable group of college graduates now completing two years of active enlisted service before entering the Army Reserve or the National Guard for the remainder of their military obligation. Qualified soldiers who have not attained a college education are also eligible.

Among approaches leading to a commission from enlisted status are Officer Candidate School; Presidential appointment to the U. S. Military Academy (by competitive examination) from within the Army, National Guard or Reserve units; and application for direct commission in technical and professional fields where officer shortages exist.

Commercial flight insurance coverage has recently been extended to passengers traveling aboard Military Air Transport Service aircraft. Forms now are available in MATS terminals. Patients traveling aboard air evacuation aircraft may procure forms at originating hospitals.

Official Notes

ENLISTED ASSIGNMENT. AR 611-253 prescribe procedures for assignment of enlisted personnel in the replacement stream or returning from overseas.

CIVIL DEFENSE. AR 500-70 prescribe responsibilities, policy and guidance for the Army Establishment in operations involving military assistance to civil defense authorities.

TRANSPORTATION PAY. AR 55-34 prescribe policies and procedures whereby military or civilian personnel of the Army Establishment may be authorized payment or reimbursement of expenses for performance of local travel (as opposed to TDY directed travel) necessary in conducting official Government business within and around duty stations.

TROOP TRAIN RATIONS. AR 31-154 prescribe procedures governing issue of rations for personnel traveling by troop train or motor convoy.

FOREIGN CLAIMS. AR 25-90 prescribe basis for settlement of claims by inhabitants of a foreign country for death or personal injury, damage or loss or destruction of public or private property caused by military personnel or civilian employees.

BUDDY ASSIGNMENT PLAN. AR 601-213 authorize enlistment of groups under the Buddy Assignment Plan, designed to establish an inducement to further enhance the U.S. Army Recruiting Program.

Crevasse Detector and Mine Layer— Hidden Barriers are their Business

TWO UNIQUE vehicular devices have recently been developed for Army use. One device detects underground hazards, another creates them, and while the hazards are entirely different in nature, both machines have a common purpose—protection of troops. Both were developed by the Corps of Engineers Research and Development Laboratories, Fort Belvoir, Virginia.

THE FIRST machine—a crevasse detector—consists of a weasel equipped with a dishpan-like device that warns of hidden crevasses. Curved electrodes skid over the snow, sending down an electric impulse. An abrupt drop in current sounds a buzzer inside the weasel to announce a cleft in the ice sheet that must be carefully investigated before the party can move on. The machine recently blazed a 600-mile route from Little America V to little-known Marie Byrd land—site for the American International Geophysical Year base in Antarctica.

THE SECOND device is a mechanical mine planter designed to reduce the time needed to lay an antitank type minefield. It carries the mines in a "lazy susan" type magazine which automatically feeds them to the planting mechanism. The latter consists primarily of a large side-elevating plow, which opens a trench to receive the mines. A mechanism arms the mine and drops it into the trench, after which the soil drops back into place.

Operated by one man, the planter can be pulled by any large crawler tractor; and it may be towed at regular highway speeds. It was developed by joint effort of Army research personnel and the International Harvester Company of Chicago.

See back cover for view of Crevasse Detector (top) and Mechanical Mine Layer (bottom).

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